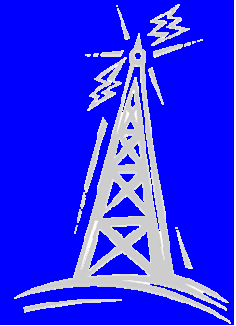


# Public Safety Radio Strategic Planning Committee

## *2006 Statewide Integrated Public Safety Communications Strategic Plan*



*A plan for California State public safety communications  
system integration, modernization and interoperability*



## *Compendium of References*

*to the Report to the California State Legislature  
as required by Government Code § 8592.6*

*January 1, 2006*

# **Public Safety Radio**

## **Strategic Planning Committee:**

*2006 Statewide Integrated Public Safety*

### *Communications Strategic Plan*

---

*A plan for California State public safety communications system  
integration, modernization, and interoperability*

***COMPENDIUM OF REFERENCES*** to the  
***REPORT TO THE CALIFORNIA STATE LEGISLATURE***  
*AS REQUIRED BY GOVERNMENT CODE § 8592.6*

*January 1, 2006*

**Governor**  
**Arnold Schwarzenegger**

**PSRSPC Chair**  
**Henry R. Renteria**  
**Director, Governor's Office of Emergency Services**

## Compendium of References

<b>Appendix A</b>	<b>List of Public Safety Radio Strategic Planning Committee Members</b>	<b>1</b>
<b>Appendix B</b>	<b>Public Safety Radio Communications Bands</b>	<b>2</b>
<b>Appendix C</b>	<b>State Agency Overviews</b>	<b>4</b>
	<i>California Highway Patrol</i>	4
	<i>Department of Justice</i>	5
	<i>Department of Transportation</i>	6
	<i>Department of Corrections and Rehabilitation</i>	7
	<i>Department of Parks and Recreation</i>	12
	<i>Department of Fish and Game</i>	13
	<i>Department of Forestry and Fire Protection</i>	14
	<i>Department of Water Resources</i>	15
	<i>Governor's Office of Emergency Services</i>	16
	<i>Emergency Medical Services Authority</i>	17
	<i>Department of General Services</i>	18
	<i>Governor's Office of Homeland Security</i>	19
<b>Appendix D</b>	<b>Success Stories and Best Practices</b>	<b>21</b>
	<i>Department of Forestry and Fire Protection Mutual Aid Communications</i>	21
	<i>San Diego County - Imperial County Regional Communications System</i>	22
	<i>Los Angeles Regional Tactical Communications System</i>	25
	<i>Sacramento Regional Radio Communications System</i>	27
	<i>CalTrans/CHP Partnership: Transportation Management Centers (TMC)</i>	27
	<i>California Fire Service Efforts</i>	28
<b>Appendix E</b>	<b>Detailed Evaluation of 1997 and 1999 Reports</b>	<b>29</b>
<b>Appendix F</b>	<b>History</b>	<b>42</b>
<b>Appendix G</b>	<b>Sample Scenario</b>	<b>47</b>
<b>Appendix H</b>	<b>Map of Mutual Aid Regions and UASI Cities</b>	<b>51</b>

*The Compendium of References (Appendices) is intended as supplemental material to the main Report and Strategic Plan.*

## **Appendix A**

### **List of Members Public Safety Radio Strategic Planning Committee**

#### **Executive Sponsors:**

Directors or their designees of the following agencies:

- The California Highway Patrol
- The Department of Transportation
- The Department of Corrections and Rehabilitation
- The Department of Parks and Recreation
- The Department of Fish and Game
- The Department of Forestry and Fire Protection
- *The Department of Health Services\**
- The Department of Justice
- The Department of Water Resources
- The Office of Emergency Services
- The Emergency Medical Services Authority
- The Department of General Services
- The Office of Homeland Security

Consultative organizations listed in the legislation to be involved in the effort:

- California State Peace Officers Association
- California Police Chiefs Association
- California State Sheriffs' Association
- California Professional Firefighters
- California Fire Chiefs Association
- California State Association of Counties
- League of California Cities
- California State Firefighters Association
- California Coalition of Law Enforcement Associations
- California Correctional Peace Officers Association
- CDF Firefighters
- California Union of Safety Employees
- The CA State Military Department

*\*Will be added to membership officially through legislation*

## Appendix B

### Public Safety Radio Communications Bands

#### Public Safety Radio Communications Bands

Reference Name	Frequency Band	Characteristics, State Users, Notes
"High Frequency"	2 – 25 MHz	"Long haul" disaster communications. Used by CDF, CalTrans, and OES for intra-state and inter-state coordination. <i>Not subject to FCC's "Refarming" initiatives or digital radio standards.</i>
"VHF – Lo Band"	30 – 50 MHz	Good for penetration in hilly or open areas, but not into buildings or for hand-held radios. Local activities are frequently interfered with by out-of-area operations ("skip"). Used by CDCR, CDF, CHP, CalTrans, and OES. <i>Not subject to FCC's "Refarming" initiatives or digital radio standards.</i>
"VHF – Mid Band"	72 – 76 MHz	Fixed (point – to – point) links. Used by CHP <i>Not subject to FCC's "Refarming" initiatives or digital radio standards.</i>
"VHF – Hi Band"	136 – 174 MHz	Mixed Federal / non-Federal spectrum 136 – 150 MHz Military [NTIA-controlled] 150 – 162 MHz non-Federal [FCC-controlled] 162 – 174 MHz Federal [NTIA-controlled] Widely used band in state and Federal systems. Offers good coverage in hilly terrain and in urban areas. Signals are generally not affected by dense foliage, but poor penetration into steel and masonry buildings. Used by CDCR, CDF, CHP, DFG, DGS, DOJ, DPR, DWR, and OES. <i>Subject to FCC's "Refarming" initiatives</i>
"220 MHz Band"	220 – 222 MHz	Predominately for industrial users, but some public safety allocations. Lightly used in California, mostly by local agencies for non life-safety applications (e.g. public works). <i>Not subject to FCC's "refarming" initiatives or digital radio standards.</i>
"406 MHz Band"	406 – 420 MHz	Federal spectrum, NTIA-controlled; used by state departments (CDF, OES, EMSA) who are cooperators with Federal users (USFS, DHS, HHS). NTIA has mandated narrow bandwidths starting 01/01/2005
"UHF Band"	450 – 470 MHz	Non-Federal spectrum. Shares many of the aspects of VHF-High band; better building penetration, in exchange for less range on signals. Used by CDCR, CHP, numerous small departments, OES <i>Subject to FCC's "Refarming" initiatives</i>

*(Continued next page)*

**Not included in this table are the Aviation frequencies (108-136 MHz) and the Marine Radio Frequencies (156 – 162 MHz) used by some public safety agencies to communicate with non-public safety entities.**

**Public Safety Radio Communications Bands (Continued)**

Reference Name	Frequency Band	Characteristics, State users, notes
"UHF – TV Band"	470 – 512 MHz	Television Broadcast spectrum (Channels 14 – 20) reallocated to Public Safety and industrial services in 13 largest metropolitan areas of U.S. Characteristics same as UHF band. Channels 14, 16, and 20 in Los Angeles area Used by Los Angeles County and majority of cities for Law Enforcement operations Channels 16 and 17 in San Francisco Bay area. Used by local systems in Marin, San Mateo, and Santa Clara counties <i>Subject to FCC's "Refarming" initiatives</i>
"700 MHz Band"	764 – 776 MHz 794 – 806 MHz	New band (established 1998) for Public Safety, reallocated from Television Broadcast. Provides shorter range than UHF bands, excellent penetration into some building materials, very poor penetration into other building materials. Requires more infrastructure (fixed sites) to provide coverage over a given area compared to VHF-High or UHF bands. Does not cover well in dense foliage. Voice and data allocations Portion allocated exclusively to States Portion allocated exclusively to Interoperability <u>Not available in most areas of California until incumbent TV stations relocate (This date is uncertain. Current legislation in Congress proposes April 7, 2009)</u> <i>All operations must use new digital technologies.</i>
"800 MHz Band"	806 – 821 MHz 851 – 866 MHz	Mixed Industrial, Cellular-like (Nextel), and Public Safety systems. Provides shorter range than UHF bands, excellent penetration into some building materials, very poor penetration into other building materials. Requires additional infrastructure (fixed sites) to provide coverage over a given area compared to VHF-High or UHF bands. Does not cover well in dense foliage. Used by CalTrans, CDCR, DGS, DPR, Legislature, and OES <i>While not subject to the "Refarming" initiatives or the digital radio standards, the "800" and "NPSPAC" bands are under an FCC-mandated realignment plan to correct interference issues. This is being handled in four 'waves' nationally; the 48 northern-most counties in California are in Wave 1, and the 10 southern-most counties in California are in Wave 4. This transition will take place in the 2006-2008 time frame.</i>
"NPSPAC Band"	821 – 824 MHz 866 – 869 MHz	Public Safety exclusive band, same coverage as 700 MHz and 800 MHz. Used by CalTrans, CDCR, DGS, DPR, and OES <i>While not subject to the "Refarming" initiatives or the digital radio standards, the "800" and "NPSPAC" bands are under an FCC-mandated realignment plan to correct interference issues. This is being handled in four 'waves' nationally; the 48 northern-most counties in California are in Wave 1, and the 10 southern-most counties in California are in Wave 4. This transition will take place in the 2006-2008 time frame.</i>
"4.9 GHz Band"	4940 – 4990 MHz	New band (established in 2003) for Public Safety wireless data ("Wi-Fi") applications. Low power, small coverage areas (< ¾ mile), share data among PCs PDA,s etc..

## Appendix C

### California State Agencies—A Communications Overview

#### *The California Highway Patrol*

##### *Current Status*

Today's California Highway Patrol (CHP) responsibilities include commercial vehicle enforcement (truck and bus inspections), air operations (both airplanes and helicopters patrolling the state's infrastructure and vital assets) and vehicle theft investigation and prevention. The 1995 merger with the California State Police (CSP) also increased the areas of responsibility to include protection of state property and employees, the Governor, State Constitutional Officers, and other dignitaries.

The primary mission of the CHP is "the management and regulation of traffic to achieve safe, lawful, and efficient use of the highway transportation system." As a major statewide law enforcement agency, the secondary mission of the Department is to assist in emergencies exceeding local capabilities. The CHP also provides disaster and lifesaving assistance.

The purpose of the radio system is to provide statewide public safety radio communications, including dispatching services for all CHP officers. Additionally, it is to provide radio channels for tactical and emergency operations, and administrative details.

##### *Challenges*

The Department must use a variety of different communications devices and systems in order to perform the objectives of the primary mission because the existing low-band Very High Frequency (VHF) system is congested and does not provide the ability of communicating car-to-car over a wide area. The patrol officer uses a low-powered portable radio subsystem that extends the capabilities of the enforcement vehicle's mobile radio while outside of the vehicle on enforcement stops. The road patrol officer also has the ability to conduct drivers license, vehicle record checks via a mobile digital computer (MDC) that utilizes a non-governmental entity owned private network throughout the state. In addition, the Nextel system is used for administrative details and special events because the existing low-band VHF system is not conducive for these types of radio communications.

##### *Future plans*

The CHP is in the process of enhancing its public safety radio communications system. The enhanced system will allow for additional radio channels (more capacity) and greater distances for radio communications while outside of the vehicle on enforcement stops. The CHP requires statewide radio coverage. The propagation characteristics of the low band radio frequencies work best for statewide radio coverage. Using the low band radio frequencies requires less radio sites (radio vaults and antenna structures) to provide the required radio coverage.



## **The Department of Justice**

### ***Current Status***

The Department of Justice's (DOJ) radio system is a statewide repeater-based analog system established in the late 1970's as a dedicated network. The system's infrastructure consists of 29 radio repeaters and 12 control stations. The field equipment used by DOJ's special agents, within the Division of Law Enforcement, Division of Gambling Control, and the Firearms's Division, includes approximately 600 mobile and portable radios. The repeater system was designed for radio coverage over several controlled geographical areas throughout the state and can be selected on an individual basis. Access to the system infrastructure can be accomplished with the use of base/control stations, dispatch consoles, mobile (vehicular) radios, or portable (hand-held) radios.

The DOJ radio system provides all radio communications for the following Bureaus/Divisions: the Bureau of Narcotic Enforcement (BNE), the California Bureau of Investigation (CBI), the Criminal Intelligence Bureau (CIB), and the Division of Gambling Control.

The DOJ radio system is used by the various Bureaus/Divisions when performing public safety activities such as:

- Enforcement of state and federal controlled substances laws and investigation and apprehension of violent criminals who utilize illegal weapons.
- Combating the complex problems associated with arresting and prosecuting major drug dealers, violent career criminals, sex offenders, clandestine drug manufacturers, and violators of prescription drugs.
- Conducting investigations of intrastate, multi-jurisdictional criminal organizations or individuals trafficking in controlled substances; conducting/assisting in investigations of violent career criminals who possess or use illegal weapons, firearms and explosives; conducting investigations of clandestine drug laboratories; monitoring and investigating persons licensed to prescribe or dispense controlled substances; and conducting complex criminal sexual offenses.
- Conducting multi-jurisdictional activities of targeted organized crime groups, gangs, and criminal extremist organizations operating in California.

### ***Challenges***

The DOJ radio system infrastructure utilized for conducting public safety activities has exceeded the end of its useful life. Approximately half of the mobile and portable radios have reached the end of their useful life and should be replaced in the near future. The electrical performance, radio coverage, and equipment have deteriorated over the years. The cost of maintaining this equipment has escalated considerably over the past four years. DOJ's radio system infrastructure is so old that replacement parts for many of the repeaters are no longer manufactured.

The existing DOJ radio equipment can only communicate in a single radio frequency band and in the analog mode, and is not compatible with newer digital radio systems being deployed by allied agencies (local, state and federal). The need for newer standard equipment technology will allow a high degree of equipment interoperability, compatibility, security (encryption) and economy of scale. Interoperability with allied public safety agencies is essential for the safety of sworn personnel during emergencies.



### ***Future Plans***

DOJ has submitted a Budget Change Proposal (BCP) to modernize the entire radio system. This will include replacing all repeaters, control stations, mobile radios and portable radios with digital and narrow band capable equipment. This modernization will bring DOJ's radio system in compliance with "APCO Project 25" standards.

### ***The Department of Transportation***

The California Department of Transportation (CalTrans) is responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries. Alone and in partnership with Amtrak, CalTrans is also involved in the support of intercity passenger rail service in California, and is a leader in promoting the use of alternative modes of transportation. The current framework of CalTrans was set down by Assembly Bill 69 in 1972. CalTrans areas of responsibility include:

- 22,000 Employees
- 14,000 Fleet units (trucks, graders, cars)
- 49,135 Lane miles of road
- 12,656 Bridges
- 250 Maintenance Stations
- 88 Roadside Rests
- 364 Vista Points
- 309 Park and Ride lots
- 25,000 Acres of landscaping
- 310 Pumping Plants

### ***Current Status***

The purpose of the CalTrans radio system is to provide reliable communications, thereby enhancing worker safety and productivity, and enhancing the safety of the traveling public.

CalTrans has been converting from a 47 MHz (VHF-low band) system to an 800 MHz system since the early 1980s. Conversion is complete in eight districts (3, 4, 6, 7, 8, 9, 11 and 12) and is underway in four (1, 2, 5 and 10). However, without additional funding, CalTrans 800 MHz radio conversion will take many more years to complete. The funding referenced in this report, and endorsed by the PSRSPC TWG, would allow this conversion to be completed within approximately 4 years. Seamless communications interoperability would then be possible.

Over the last two years, CalTrans has accelerated radio equipment replacement in the Southern California area. The new equipment operates on the 700 MHz and 800 MHz bands and is APCO Project 25 compliant. This equipment enhances interoperability both within CalTrans and with other public safety agencies, and can operate on the 700 MHz frequencies recently allocated by the FCC.

The system infrastructure uses 272 sites (184 high-level [e.g., mountain-top] repeaters, and 88 low-level sites [i.e., 6 roadside repeaters and 82 maintenance stations]). Many, but not all of the repeaters are automatically linked together, and most can be linked as needed for long distance communication. CalTrans has only 15 channel pairs, which has caused congestion in urban areas and the Central Valley. CalTrans also participates in two regional communications systems, San Diego County and Sacramento County.

### ***Challenges***

CalTrans challenges include the proliferation of cellular telephones in combination with the complexity of using its radio system.

Today, CalTrans radio users are required to operate low band, 800 MHz conventional and trunking radio systems, depending upon their location. In some districts, radio users are required to operate both 800 MHz and low band radio systems. As an example, in District 10, users in the eastern region of the district operate on a low band radio system while users in the western region operate on an 800 MHz radio system. It is difficult for a radio user in District 10 to operate their radio when they are required to travel between regions, especially during disaster response.

Although they have been proven to be an ineffective means of communication during emergencies, cellular telephones are almost second nature and very inexpensive. Additionally, with Nextel's "Push-to-Talk" feature, the cellular telephone functions like a radio. An easy to use, seamless and standardized radio system is required in order for radio users to effectively and efficiently use the radio system.

### ***Future Plans***

CalTrans has two essential basic needs. The greatest need is to complete implementation of the 800 MHz system. CalTrans' second need is to upgrade the infrastructure so that users will have seamless access. Additional channel capacity is also a significant issue, primarily to relieve congestion, but also to allow for growth and potential expansion of data transmissions. CalTrans needs to complete its low band to 800 MHz conversion. This will standardize its radio system, thus becoming simpler and easier to operate. This will also enhance CalTrans ability to participate in regional communications systems throughout California. CalTrans will continue to participate in Regional Communications Systems, where feasible, and enhance its communications interoperability with other public safety agencies. The utilization of recently allocated 700 MHz frequencies will also help to relieve congestion and allow for growth and potential expansion.

### ***The Department of Corrections and Rehabilitation***

Effective July 1, 2005, California's correctional system which was made up of the Youth and Adult Correctional Agency and seven departments, boards and commissions, was significantly reorganized into one organization now known as the California Department of Corrections and Rehabilitation (CDCR). This restructuring will establish clear lines of reporting, accountability and responsibility, and performance assessment that will improve services. Additionally, it will centralize services and activities to remove duplication, and leverage the scale of the CDCR's

\$7.4 billion spending authority, thus reducing the cost of operations. With this reorganization comes a unprecedented vision and mission:

#### Vision

The overarching **vision** is to end the causes and tragic effects of crime, violence, and victimization in our communities through a collaborative effort that provides intervention to at-risk populations and quality services from the time of arrest that will assist our clients in achieving successful reintegration into society.

#### Mission

The overarching **mission** is to improve public safety through evidence-based crime prevention and recidivism reduction strategies

The CDCR employs over 50,000 staff in communities throughout the state and is responsible for the custody, care, and treatment of over 305,000 juvenile and adult offenders in its facilities and/or under its supervision in the community. The CDCR operates a numerous facilities throughout the state including: State Prisons & Juvenile Facilities; Conservation Camps; Prison Mother Facilities; Community Correctional Facilities; Parole Offices; Parole Outpatient Facilities

The operational public safety radio communications needs of the CDCR staff mirror one or more of those of all of the other commonly recognized public safety and public service organizations. CDCR staff provide public safety in the forms of law enforcement, fire services, emergency medical services, emergency management and disaster services. They also provide public service in the forms of highway maintenance, fire prevention, conservation, the reintegration of offenders back into society and community public works. Adequate, effective, and interoperable public safety communications capability is required statewide, in order to accomplish these missions.

### *COMMUNICATIONS PARAMETERS—FIVE USER GROUPS*

#### Adult and Juvenile Facilities

CDCR adult and juvenile facilities can be viewed as small, fully autonomous communities. In addition to the custody staff, a variety of support staff are needed. Cooks, laundry workers, firefighters, doctors, dentists, educators and maintenance people are needed to ensure inmate/wards are housed, clothed and fed appropriately. Activities, tasks, and communications that may appear mundane, routine or administrative in normal circumstances take on significant public safety and security implications in the correctional environment. CDCR facility staff utilize radio communications to support security and operations, and are the first line of communications within the facilities to communicate critical information to control inmate/ward movement, identify illegal activity, and respond to and control emergency situations. Radio communications are considered the correctional officer's life-line and are the primary means of providing for officer safety.

For the most part, radio communications within CDCR facilities is via an 800 MHz trunked or conventional radio system, and it is generally limited to the confines of the facility. As mentioned above, CDCR has facilities located throughout the state, in both rural and urban areas. Thus CDCR has all of the same propagation requirements that the various other public safety organizations face. However, CDCR facilities also have some unique requirements. The in-building penetration requirements of CDCR facilities are significantly harder to obtain. CDCR's facility design and construction cannot be compared to typical urban campus or high rise office

building models. Many of CDCR facilities have layers and layers of concrete and close meshed rebar with little or no windows. Not an ideal public safety RF environment.

The majority of the systems and equipment in CDCR facilities has exceeded its useful life and operates with manufacturer specific proprietary signaling protocols. The CDCR's facility-based communications systems are in dire need of modernization. They may be past the point where upgrades are still viable and may require wholesale replacement.

### Adult and Juvenile Parole Operations

The CDCR Adult and Juvenile Parole operations are responsible for monitoring and supervising the activities of CDCR parolees in the community. CDCR Parole Agents perform a unique dual role of social worker and peace officer. Agents routinely work with local law enforcement on joint task forces aimed at specific types of criminal activities or to apprehend specific felons. The CDCR Parole Agents are experiencing an increase in the technical sophistication of parolees as well as an increase in those that are mentally ill and/or more prone to violence. CDCR Parole Agents having caseload responsibilities require radio/wireless communications to support the following field operations and functions:

- Immediate, emergency access to local law enforcement, for assistance with unplanned arrests, or other potentially dangerous situations.
- Coordination with various law enforcement agencies for surveillance and investigations of parolee activities.
- Handling of administrative communications while in the field, or being contacted by the CDCR supervisory personnel for both emergency and routine matters.
- Emergency and non-emergency communications, between transportation vehicles, various law enforcement agencies, parole offices, and institutions.

The majority of Parole Agents have access to a radio or cellular phone. However, a significant portion of the radios do not meet the operability or interoperability requirements of the Agents. While cellular phones provide utility to case carrying Parole Agents in their administrative functions, they are not adequate for routine tactical and emergency public safety communications.

Because CDCR does not have the resources (funding or spectrum) to build out its own public safety communications system on a statewide basis, Parole operations must rely heavily on local agencies systems. While doing business this way does provide the benefit of interoperability with some of the agencies, there is no consistency. CDCR Parole operations do not have a common platform on which to conduct business amongst themselves. In many areas, CDCR Parole caseload may be spread over 8 - 10 different jurisdictions with totally disparate radio communications systems. The availability of consistent, cost effective and cost efficient access to mobile data on a statewide basis is a Parole operation future need.

### Transportation Teams

The CDCR operates two distinct inmate/ward transportation functions. These can be distinguished as centralized/statewide transportation and facility-based transportation. Combined these transportation functions are responsible for all CDCR inmate/ward movement between the various facilities and to and from the various allied jurisdictions. The CDCR operates hundreds of vehicles, logging millions of miles annually, transporting hundreds of thousands of felons throughout the state. Centralized/statewide and facility-based Transportation Teams usually work

extended shifts from early morning to late evening. Due to the vulnerability factor while away from facilities, transporting inmate/wards is a very high risk endeavor. As the inmate/ward population continues to grow and the CDCR acquires additional facilities to handle the growth, there will be a relational impact on the transportation functions. Transportation Teams require radios to support the following functions:

- Immediate, emergency access to local law enforcement, for assistance with escapees and other potentially dangerous situations.
- Emergency and non-emergency communications, between transportation vehicles, various law-enforcement agencies, and institutions.
- Primary means of providing for officer safety.

Historically, the Transportation Teams have utilized radios that operate on the California Highway Patrol Blue Channel in the VHF low band. Due to increasing congestion on the CHP systems and the failure to keep pace with CHP system equipment requirement changes, the Transportation Teams now uses cellular telephones extensively. However, cellular capabilities are still significantly inadequate for the Transportation Team requirements.

In order to manage the growing demands placed on the centralized/statewide and facility-based Transportation Teams, automated systems for scheduling and routing of transportation vehicles, and real-time access to vehicle location and the ability to transmit schedule, route or passenger list changes while enroute will be required to ensure the transportation functions efficiency, reduce costs, and increase public safety. As with other Departmental entities, the Transportation Unit is a relatively small operational unit that requires various forms of public safety radio communications on a statewide basis.

#### Fire and Conservation Camps

The CDCR currently operates numerous minimum security camps, primarily in the rural areas. Each of these camps houses 70 - 120 inmates/wards. CDCR staff are responsible for providing round-the-clock, seven-day-a-week supervision. These camps are operated in conjunction with either the California Department of Forestry (CDF) or the Los Angeles County Fire Department (LACoFD). CDF or LACoFD provide oversight of camp inmate/wards during conservation and/or actual fire fighting activities. The Camps staff and inmate/wards are responsible for annually providing over 2 million hours of fire prevention and fire fighting effort as well as over 6 million hours of conservation and community service work.

CDCR Camps staffs are responsible for providing in-camp security, escape pursuit, and necessary inmate/ward transportation to and from base institutions or base camps of large fire scenes. The base camps of large fire scenes, or the establishment of large temporary community kitchens during natural disasters often require CDCR staff to provide security for hundreds of inmates in a make shift environment.

The Camps staffs currently only have access to limited emergency use of the CDF and/or LACoFD radio system, using mobile radios in camp vehicles. Most Camp staff have access to cellular phones to be used when traveling to emergency fire base camps. Due to the nature of cellular coverage, its utility, and the rural locations of most camps and/or emergency fire camps, their use is limited. Staff working within the camps or traveling away from the camp have no other form of public safety radio communications. This makes enroute redirection, or coordination of escape pursuit with local law enforcement, very difficult.

The CDCR Camps staffs require various additional public safety radio communications capabilities. These include in-camp communications, interoperability with local law enforcement, statewide itinerant dispatch during transportation, as well as statewide itinerant operation for fire base camp situations. While primarily a law enforcement organization, its day to day operations are closely aligned with forestry and conservation functions, creating a diversity of interoperability needs. The unique driving consideration for a unit of this size is to be able to find viable, cost efficient, and effective solutions to meet their public safety radio communications needs consistently throughout the state.

### Field Investigations

CDCR Special Agents provides investigative liaison services to local law enforcement agencies statewide in solving crimes when inmate/wards or parolees are known or suspected of involvement. They are particularly involved in the area prison gang/street gang activities. They also provide specialized investigative service for the CDCR's various facilities, programs, divisions, etc. The majority of their work requires Special Agents to operate undercover. While they are small in terms of numbers of staff, their responsibilities cover the entire state and they are responsible for liaison with potentially with any of the 58 county Sheriffs or the more than 340 local police departments. Special agents utilize radio communications to support the following field operations:

- Immediate access to local law enforcement for assistance, planned or unplanned arrests, and routine mutual aid during investigations involving active parolees, parolees-at-large, and escapees.
- Coordination with local law enforcement agencies during surveillance and investigations of parolees suspected of criminal activities.
- Emergency and non-emergency communications between CDC transportation vehicles, parole agents, and institution personnel.

In an attempt to meet some of the Special Agents public safety radio communications needs, they currently use three different radios. Most Special Agents have limited emergency access to the CHP's, already overburdened low band system, and they have both UHF and VHF portables with access to some of the various local law enforcement systems. Special Agents also use cellular to handle some of their public safety communications as well as their administrative needs. The Special Agents are experiencing an increase in the technical sophistication, and propensity to violence of the felons they encounter.

As with CDCR Parole operations, Special Agent communications are via a combination of radios on other public safety agencies systems and cellular phones. Special Agents have negotiated fewer frequency use agreements than Parole operations. While individual Parole agents work in a limited regional geographic area, Special Agents may need to work anywhere in the State on any given day, thus they have very limited communications coverage.

The unique driving considerations for Special Agents are interoperability with a variety of local, state and federal law enforcement agencies on a statewide basis, as well as having access to spectrum on a statewide basis for internal tactical and administrative communications. Additionally, given the relatively small size of the operational unit, viable solutions must be both cost efficient and effective.

### *POTENTIAL GAPS/NEEDS ANALYSIS*



The CDCR has made significant strides in improving the institutions' radio communications, however, the public safety communications capability of its Parole, Transportation, Camps, and Field Investigations staffs are deficient or nonexistent in many areas of the state. The lack of available frequencies for public safety agencies in many areas of the state precludes CDCR from providing radio communications for existing operations or to address program growth. CDCR public safety staff's communication capability outside of institutions is an ad-hoc conflagration of cell phones, pagers, and radios, on a multitude of disparate agency systems, operating in different frequency bands that cannot talk to each other, with varying degrees of system usage permissions from the system owners. This ad-hoc approach, neither individually nor collectively, effectively addresses the functional and operational communication requirements of CDCR's various program areas and endangers our field staff and the public. Additionally, the facility-based systems, which were once considered the "flagship" of correctional facility communications systems are now antiquated and in need of modernization. Today's radio technology costs make it prohibitive for CDCR to continue to support independent systems. The successful implementation of a statewide, interoperable system of systems as envisioned by PSRSPC in the long-term would provide the following benefits the CDCR:

- Statewide dispatch access and improved staff safety for all field staff
- Interoperability between CDCR entities and other state, local, and federal agencies
- All CDCR entities would be on a common system
- Availability of frequencies for program growth
- Statewide access to mobile data capability
- Access to National Crime Information Center for wants, warrants, criminal history
- Ability to develop field deployable CDCR-specific systems

### **The Department of Parks and Recreation**

The mission of the California Department of Parks and Recreation is to provide for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation.

One of the core programs tied to the Department's mission is Public Safety. Public Safety is comprised of those activities related to the public safety, emergency services, and law enforcement in California State Parks. There are 276 units within the California State Parks System that had in 2004, a total of 90 million visitors. Approximately 700 California State Park Peace Officers (Rangers and Lifeguards) and other non-peace officer personnel provide public safety services within California State Parks. In performance of their duties, California State Park Peace Officers and non-peace officer personnel use a variety of radio equipment and radio services within the California State Parks radio system for public safety, emergency services, and law enforcement communications.

The primary elements of the California State Parks radio system are mobile radios, portable radios, and base stations that operate in the 800MHz Band and VHF High Band. Mobile relays (124), control stations, microwave links, RTO/piece outs are connected to dispatch consoles at 3 major California State Parks public safety comm. centers for control of the mobile relay system.



In the majority of locations within the California State Parks System, public safety radio communications are conducted in the 800MHz Band. The exception is for locations within Del Norte, Humboldt, and Mendocino Counties, where it is necessary to operate in the VHF High Band for public safety radio communications.

Currently, all public safety agencies using the 800MHz Public Safety Band, including California State Parks, are affected by an order by the FCC to address interference problems within the 800MHz Band. Order FCC 04-294 will adjust the frequency allocations within the 800MHz Band to resolve those interference problems. As a result, all 800MHz radios within the California State Parks radio system are subject to reprogramming, recrystalling, or replacement in order to operate within the new frequency allocations.

California State Park Peace Officers have a need to communicate with other local, State, and Federal public safety and law enforcement agencies. Because the California State Parks radio system operates in 800MHz Band conventional mode, the ability to access 800MHz Band digital trunked radio systems is not available. In the majority of locations, California State Park Peace Officers do not have the radio equipment to access the other frequency bands used by those public safety and law enforcement agencies.

### **The Department of Fish and Game**

The Mission of the Department of Fish and Game (DFG) is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.

The Department of Fish and Game maintains native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The department is also responsible for the diversified use of fish and wildlife including recreational, commercial, scientific and educational uses.

The primary user of communication services within DFG are the Game Wardens. As sworn peace officers, Wardens are responsible for enforcing all of California's laws throughout the State, emphasizing enforcement of fishing, hunting, and pollution regulations. In addition, Game Wardens have an increasing role in Homeland Defense. Utilizing vehicles, aircraft, and vessels, Wardens are tasked with patrolling and protecting California's resources including remote critical infrastructure, marine resources up to 200 miles offshore, and nearshore and inshore developments.

The DFG radios operate on an analog VHF FM highband platform, utilizing two radio channel pairs throughout the state. There are 75 mobile relay stations, most of which are connected to dispatch centers to allow for support of the warden's mission. Three of those dispatch centers are operated by the Department of Parks and Recreation, from whom DFG subscribes to dispatch services. Other dispatch service is provided by the California Highway Patrol and some local government agencies. The radio equipment includes mobile radios, handheld radios, and some aircraft radios.

DFG's radio system has remained stagnant for many years, despite several reports to the legislature outlining the needs for improving communications for field peace officers. The latest report, prepared in the late 1990s by the Telecommunications Division of the Department of General Services, outlined the need for an additional 80 mobile relay stations, more channel pairs, and associated interconnectivity to dispatch centers to meet the basic needs of the warden personnel. Lack of funding, however, has resulted in very few of those recommendations ever coming to fruition.

DFG is a special funded agency, deriving the majority of its budget from licensing fees for hunters and anglers within the State. As the income from such licenses has tapered off over the years, funds have become more scarce. The communications needs of wardens are in competition with the funding needs of fish hatcheries, wildlife biologists, and other critical missions of the Department.

About 50% of the mobile and handheld radio equipment within the DFG radio system has exceeded the recommended life cycle and is obsolete. Over 95% of the infrastructure needs replacement or upgrade to comply with the narrowband mandate by the Federal Communications Commission (FCC). Because of a lack of funding, DFG has not been able to move forward in complying with the requirements of California Government Code 8592 with regard to "Project 25" compatible equipment procurements.

Frequency use issues also are a problem for DFG; not enough radio channels are available for special use, such as hunting season openers, special investigations and wildlife management activities. Recent administrative boundary changes within the department have created issues with regard to incorrect radio nets serving wardens whose squad boundaries have now changed. A better coordinated effort to create new shared resources is needed to meet this demand. DFG hopes the work products of Public Safety Radio Strategic Planning Committee to coordinate the frequency usage of all State and other cooperative agencies will assist in creating the needed resources.

### **Department of Forestry and Fire Protection**

Responding to all types of emergencies on a daily basis is the role played by most of the workforce of the Department of Forestry and Fire Protection (CDF). Those emergencies take the form of wildland fires, residential/commercial structure fires, automobile accidents, heart attacks, drownings, lost hikers, hazardous material spills on highways, train wrecks, floods, earthquakes - the list is endless. CDF's firefighters, fire engines and aircraft respond to an average of more than 5,700 wildland fires, and answer the call more than 300,000 times for other emergencies each year.

CDF crews and equipment are a familiar sight throughout the State with responsibility for the protection of over 31 million acres of California's privately-owned wildlands. In addition, they provide emergency services of all kinds within 36 of California's 58 counties through local government contracts. Many areas of the State are not covered by our radio system and build out is needed.

The CDF radios operate on an analog VHF FM highband platform. There are 24 dispatch centers and 21 of those are E911 centers, and 11 are interagency centers. The radio equipment includes

250 repeaters, 210 control stations, 342 base stations, 2400 mobile radios, 3800 handheld radios, and 147 aircraft radios.

The radio system utilized by CDF has evolved into one that serves the agency's mission well. Being a system that utilizes the frequency plans and equipment recommended by the California FIREScope committee, interagency and cooperator communications are handled well...provided that other cooperators also follow the same FIREScope recommendations.

Within the CDF radio system, one of the largest in the United States, over 45% of the equipment has exceeded the recommended life cycle and is obsolete. Over 90% of the infrastructure needs replacement or upgrade to comply with the narrowband mandate by the Federal Communications Commission (FCC).

These equipment obsolescence issues force CDF to take immediate steps to modernize its equipment complement. The California Legislature recognized this problem in the 2005/06 budget year by funding the first year of a five-year equipment modernization program. While this program will meet the immediate needs of CDF in terms of FCC mandates, it was not sufficient to bring CDF's radio system into compliance with the strict terms of California Government Code §8592, which requires eventual compliance with "APCO Project 25" standards. To fully meet these requirements would add perhaps \$10-15 million to the price tag of the modernization program.

In addition, frequency use issues continue to plague CDF; not enough radio channels are available for fire incident and campaign use, and a coordinated effort to create new shared resources is needed to meet this demand. CDF applauds the efforts of PSRSPC to coordinate the frequency usage of all State and other cooperative agencies and believes such a master planning effort will meet the long term needs of both CDF as well as the State as a whole.

### **The Department of Water Resources**

The Department of Water Resource's (DWR) Strategic Planning Goals are:

- Develop and assess strategies for managing the State's water resources, including development of the California Water Plan Update;
- Plan, design, construct, operate, and maintain the State Water Project to achieve maximum flexibility, safety, and reliability;
- Protect and improve the water resources and dependent ecosystems of statewide significance, including the Sacramento-San Joaquin Bay-Delta Estuary;
- Protect lives and infrastructure as they relate to dams, floods, droughts, watersheds impacted by fire and disasters, and assist in other emergencies;
- Provide policy direction and legislative guidance on water and energy issues and educate the public on the importance, hazards, and efficient use of water;
- Support local planning and integrated regional water management through technical and financial assistance.
- Perform efficiently all statutory, legal, and fiduciary responsibilities regarding management of State long-term power contracts and servicing of power revenue bonds;
- Provide professional, cost-effective, and timely services in support of DWR's programs, consistent with governmental regulatory and policy requirements.

DWR operates California's State Water Project (SWP), the largest State-built multipurpose project in the United States. The SWP was designed in the 1950s and 1960s. Most SWP construction was done during the 1960s and 1970s, with some later additions. The SWP, spanning more than 600 miles from Northern California to Southern California, includes 32 storage facilities, 17 pumping plants, 3 pumping-generating plants, 5 hydroelectric power plants, and approximately 693 miles of canals and pipelines, including the newest section, the East Branch Extension located in Southern California. DWR operates and maintains the SWP and delivers, on average, 2.4 million acre-feet of water per year to the 29 water agencies who are repaying the cost, plus interest, of financing, constructing, operating, and maintaining the SWP storage and conveyance facilities. Through the SWP, DWR supplies good quality water for municipal, industrial, agricultural, and recreational uses and for protecting and enhancing fish and wildlife.

DWR has the responsibility of protecting public health, life, and property by regulating the safety of dams, providing flood protection, and responding to emergencies. DWR meets these responsibilities through the following activities:

- Continually supervising design, construction, enlargement, alteration, removal, operation, and maintenance of more than 1,200 jurisdictional dams;
- Encouraging preventive floodplain management practices; regulating activities along Central Valley floodways;
- Maintaining and operating specified Central Valley flood control facilities;
- Cooperating in flood control planning and facility development;
- Maintaining the State-Federal Flood Operations Center and the Eureka Flood Center to provide flood advisory information to other agencies and the public;
- Cooperating and coordinating in flood emergency activities and other emergencies. (Water Code section 600 et seq.)

DWR's Current system progress and needs: DWR has purchased and is in the process of replacing 20+ year old VHF High Band mobile radio repeaters statewide with wideband/narrowband digital capable repeaters. Base stations and consoles are planned for upgrade as soon as funding permits. Some of the challenges facing DWR's Two Way Radio system are:

- The need to expand and enhance the Two Way Radio system by adding repeater sites in northern California;
- Replace all hand held and mobile radios;
- Connect base stations and consoles statewide to provide a seamless integrated radio network;
- Interoperability/mutual aid;
- Ongoing training.

### **The Governor's Office of Emergency Services**

The Governor's Office of Emergency Services (OES) was established by the California Emergency Services Act (Chapter 7 of Title 2 of the Government Code), and is California's Emergency Management and Planning agency.

OES is charged with the coordination of the emergency activities of all state agencies during a *state of war emergency, a state of emergency, or a local emergency* as defined in Section 8558 of the Government Code. OES administers the *California Disaster and Civil Defense Master Mutual Aid Agreement* and subordinate Mutual Aid agreements made and entered into by and between the State of California, its various departments and agencies, and the various political subdivisions of the state, to facilitate implementation of the Legislature's intent of providing for an effective emergency response organization and to eliminate the requirement for separate "joint powers" agreements between entities for emergency support.

In fulfillment of this mission, OES owns and operates four public safety radio networks (Emergency Management, Fire and Rescue, and Law Enforcement) dedicated to Direction & Control and Mutual Aid Coordination communications, and administers the State's field-level Mutual Aid / Interoperability communications efforts and spectrum. OES also operates the Operational Area Satellite Information System (OASIS), a satellite-based telephone and data communications network between Emergency Management operations centers at the State and County (Operational Area) level. In addition, OES has a fleet of 125 pieces of fire apparatus, and approximately 20 mobile command vehicles used to facilitate incident coordination communications.

*Challenges:* Funding for the maintenance and ongoing replacement of the infrastructure of the four public safety radio networks has been cut back due to additional (non-communications) program requirements placed on the agency without funding support, compounded by the state's budget issues. Funding was found during the 1999-2000 "Y2K" awareness period to update the fire apparatus mobile radio fleet and the 65 Fire Operational Area communications center base stations operating on the Fire and Rescue Radio Network, but the majority of the agency's fixed public safety communications infrastructure is 13 to 30 years old (and beyond service life), and the mobile command vehicle radio equipment is 10 to 20 years old.

### **The Emergency Medical Services Authority**

The Emergency Medical Services (EMS) Authority is charged with providing leadership in the development and implementation of local EMS systems throughout California and in setting standards for the training and scope of practice of various levels of EMS personnel. California has thirty-one local EMS systems that are providing emergency medical services for California's fifty-eight counties. Seven regional EMS systems comprised of thirty-three counties and twenty-five single county agencies provide the services. Regional systems are usually comprised of small, more rural, less-populated counties and single-county systems generally exist in the larger and more urban counties.

The EMS Authority also has responsibility for promoting disaster medical preparedness throughout the state, and, when required, managing the state's medical response to major disasters. Emergency and disaster medical services in California are rooted in the skills and commitment of the first responders, EMTs, nurses, physicians, and administrators who deliver care to the public and operate the system. In order for high quality services to be delivered with high efficiency, all aspects of EMS systems must work together, mutually reinforcing and supporting each other for the benefit of the patient.

*Challenges:* Day-to-day EMS system management is the responsibility of the local EMS agencies. It is principally through these agencies that the EMS Authority works to promote quality EMS services statewide. Communications systems are no exception. Some of the key issues facing virtually all areas of California are:

- Lack of ability for providers (EMS and public safety) to communicate with each other.
- Gaps in communications coverage in some areas and conflicting coverage in others.
- An aging communications hardware and system backbone.
- No recognized standards to guide the development of EMS communications.
- Limited statewide direction or technical guidance on EMS communications issues.
- Lack of funding to respond to these issues.

*Future Plans:* The ability to respond effectively during local emergencies and natural or man made disaster throughout California is the main focus. All facets of the EMS community should be interfaced using regional, interoperable voice and data system(s), with statewide access whenever required. This should include first responders, hospitals, public health, and other medical resources. Having access to a statewide infrastructure, utilizing navigation and tracking tools, and having real time knowledge on available resources are some of the areas being pursued at this time.

### **The Department of General Services**

California citizens and government agencies depend upon state telecommunication systems to conduct routine business and obtain assistance during emergencies. With excellent customer service in mind, about 500 dedicated people statewide in the Department of General Services Telecommunications Division (DGS-TD) work behind the scenes in two offices to ensure that these essential systems are there when needed. These offices are:

#### *The California 9-1-1 Emergency Communications Office*

The 911 office serves over 34 million people in 58 counties in the 5th largest economy in the world. They provide oversight of the 9-1-1 network and over 500 police, fire, and paramedic dispatch centers, also known as Public Safety Answering Points (PSAPs). Their dedication helps keep Californians connected during times of crisis.

#### *The Office of Public Safety Radio Service (PSRS)*

Has supported the public safety sector for more than 50 years. From scaling 100 foot tall radio antenna towers to installing and maintaining radio and microwave equipment, to repairing mobile communication units in California Highway Patrol cars and Department of Forestry outposts, the PSRS is the premier one-stop shop for public emergency communications systems support. The PSRS designs, installs, licenses, and maintains Public Safety Radio Systems for state, federal, and local government agencies involved in the protection of life and property for the citizens of California. This office serves numerous state organizations, including the following ten major public safety agencies: the Departments of Water Resources, Transportation, Forestry, and Fire Protection, Parks and Recreation, Fish and Game, Justice, Corrections, Youth Authority, California Highway Patrol and the Governor's Office of Emergency Services. Additional clients



include the Federal Bureau of Investigation, U.S. Coast Guard, and the National Weather Service as well as several California cities and counties.

With a commitment to excellence, the PSRS provides a broad range of engineering, maintenance, and administrative services to California state agencies. Duties range from complete system design and augmentation to installation and maintenance. Other services provided are: frequency coordination, procurement, specification development & compliance, vault space management, and microwave service. Having all these services under one roof, DGS-TD Public Safety Radio functions as a comprehensive service provider and consultant. PSRS offerings include the following:

- Client Representation and Project Management
- System Design and Engineering
- Frequency Coordination and Licensing
- Vault & Tower Installation and Management, Lease Agreements
- Procurement, Specification Development, and Compliance Testing
- Public Safety Vehicle Accessories and Customized Equipment
- Microwave Subscriber Service
- Installation and Maintenance
- Equipment Repair

### **The Office of Homeland Security**

Interoperability in California is of the utmost importance to the Office of Homeland Security (OHS). It is not only important for the post-incident response but for the pre-incident coordination. Ensuring that our state and local first responders can speak to one another is critical to the prevention, preparation, response and recovery to a potential terrorist attack. The ability to rapidly and easily communicate data, voice communications, and all relevant information is a cornerstone of our public safety efforts.

As was documented in The 9-11 Commission Report, many of the 9-11 hijackers had contact with local law enforcement prior to their attacks. It is important that all first responders know what to look for and where to report it. This reporting must be done seamlessly to the State and local fusion centers, and to all relevant parties if we are to prevent and prepare for the next attack.

Interoperable communications are vital to response efforts as well. Coordinated communication is the key to effective response. Interoperability is built into the incident command and Statewide Emergency Management System (SEMS), and the National Incident Management System (NIMS) communications coordination structure. If our first responders are following SEMS/NIMS and setting up incident command posts utilizing the unified command structure of SEMS/NIMS, many of the problems of miscommunication can be alleviated.

OHS is committed to participating in the existing coordinated State communications structure. For hardware, OHS participates in the OES SEMS/NIMS structure through use of its satellite communications and emergency communications systems to communicate and distribute terrorism-related information. OHS has supported these efforts through funding for enhanced State communications capabilities on the state and local level. Millions of federal homeland security dollars have been spent as a part of OHS' coordinated grant expenditure strategy to improve communications equipment on both the State and local level. While not enough



Homeland Security dollars have come to California to fully address this large-scale issue, we are committed to working with all parties to continue to seek additional funds for this purpose.

OHS is committed to working with our federal, state and local partners to develop a coordinated policy to achieve our interoperability goals, and to developing funding strategies to achieve them.

## Appendix D

### Success Stories and Best Practices

#### *CA Department of Forestry and Fire Protection Mutual Aid Communications*

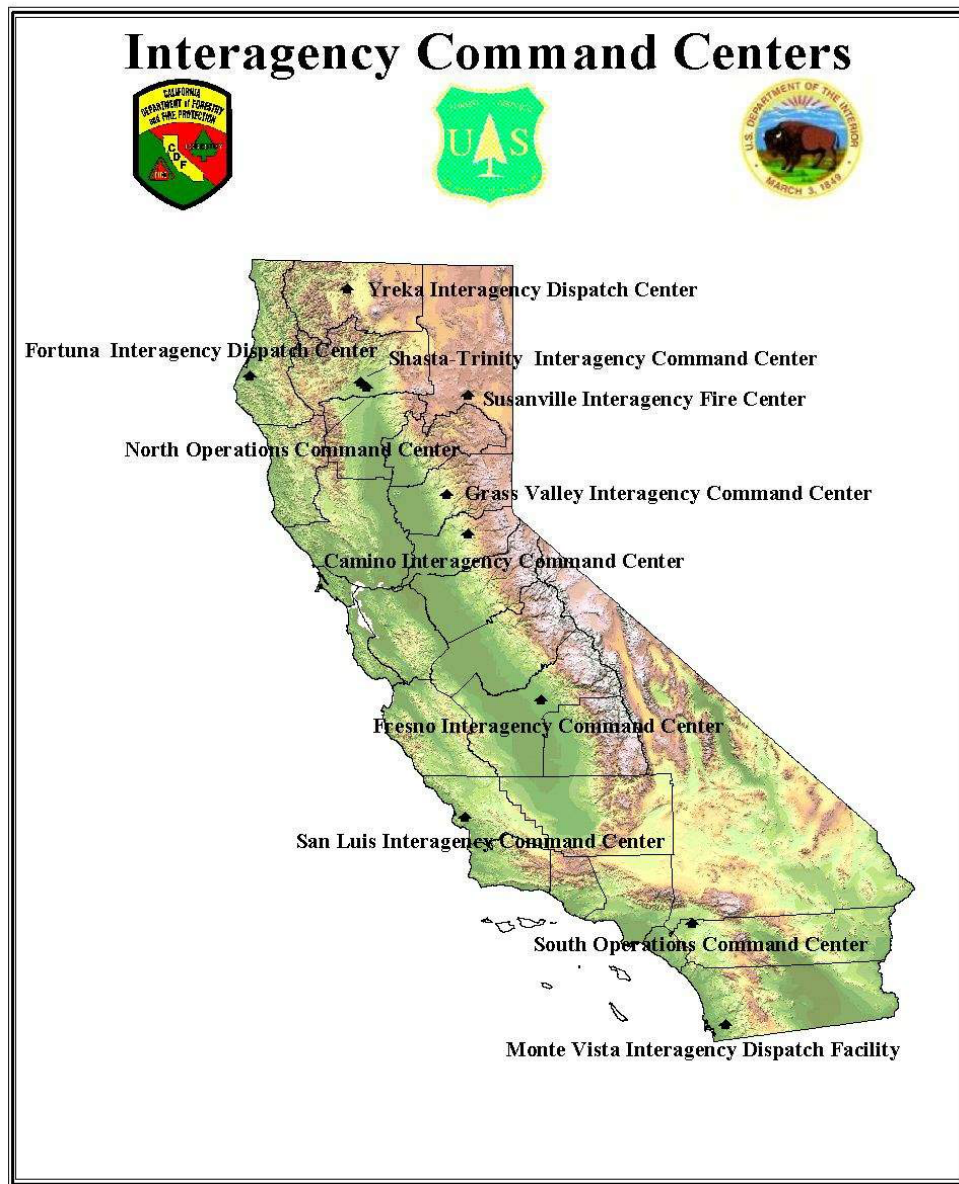
The California Department of Forestry and Fire Protection (CDF) successfully communicates with multiple agencies every day of the year using a radio platform that has been in place for forty years. The CDF communications system is a backbone for successful daily mutual aid radio operations across the state. CDF provides emergency services to local government via contract in 36 counties. The CDF Mutual Aid Plan is based on FIREScope communications recommendations and the California Fire Assistance Agreement (renewed yearly) which set a standard for adequate communications as a “VHF radio with a minimum of 32 channels and programmed as recommended in the Statewide Frequency Plans.”

The map below shows 11 joint interagency command centers that are shared by CDF and the U.S. Forest Service (USFS). CDF operates an additional 13 command centers that are not shown on the map.

CDF’s statewide communications network responds to extremes in both variety and volume of situations. In an average year, the network responds to over 5,700 wildland fires and more than 300,000 emergencies that are not related to wildland fires, including structure fires, medical aids, hazardous material spills, and traffic accidents.

Frequency agility is programmed into every CDF radio in order to facilitate operations in any area of the state. All of CDF’s VHF mobile and handheld radios are set up for cross-compatibility with USFS, contract counties and the state interoperability channels. These preparations ensure that CDF is able to communicate with all agency resources during an emergency.

All dispatch communication is done via a VHF highband system for maximum propagation and basic expandability. CDF uses a combination of its own radio system and the systems of its partners to extend the reach of its dispatch coverage. Examples of joint coverage are in Fresno, San Luis Obispo, Riverside, San Diego, Redding, Camino, Morgan Hill and every other command center CDF operates. As a testament to the system’s resilience, no failures were reported in the Riverside Unit communications system during the 2003 firestorm in Southern California.



### **San Diego County - Imperial County Regional Communications System**

The Regional Communications System (RCS) Project involved the construction of public safety, public service wireless radio communication networks that provide the primary communication links for many local, county and state governmental agencies (including CalTrans) throughout the 4,200 square mile County of San Diego and the 4,175 square mile County of Imperial. The approximately 50 networked radio repeater sites use over 150, 800 MHz frequencies and provide more than 97% coverage of the roadway network for 18,000 current users. Users include most of the fire, law, EMS and public works departments in San Diego County. The RCS planning began in 1992 with the support of the County Board of Supervisors. Project implementation began in 1995. While the County has underwritten the cost of the network, participating jurisdictions and agencies contributed a portion of the total cost. User agencies also share the annual network

operating costs. The Board of Supervisors has delegated administration of the RCS to a Board of Directors comprised primarily of top law and fire service administrators from throughout the county. County staff manages RCS operations. The County of Imperial also is a participant in the RCS and is building additional repeater sites for their user agencies. The additional sites have expanded the RCS sphere of influence to about 10,000 square miles, supporting over 217 agencies along 185 miles of the international border with Mexico between the Pacific Ocean and the Arizona border.

CalTrans was one of the partners from the inception of RCS in 1995. CalTrans currently has 870 radios (base stations, mobiles, and portables) operational on the system. CalTrans has found the level of interoperability and performance of the system very beneficial to carrying out its mission in CalTrans' District 11 (San Diego County).

#### RCS Vision:

- To provide seamless wireless communications for public safety/public service agencies serving about 3,000,000 residents in San Diego County, 150,000 residents in Imperial County, and numerous visitors each year, and
- To provide RCS users with wireless interoperability with other local systems.
  - INTEROPERABILITY means law, fire, EMS and public service can talk readily with each other to coordinate life saving responses
  - No one should lose their life or property because public safety personnel cannot communicate with each other

#### RCS Design Goals:

- Improve interoperability with existing 800 MHz systems
- Provide highly reliable wireless voice and data networks
- Achieve 95% wireless coverage of the roadway network. In fact, more than 97% was achieved for both the voice and data networks.
- Provide wireless access for a variety of computer applications, including:
  - Automatic Vehicle Location (AVL)
  - Law enforcement databases
  - Computerized dispatch operations.

#### RCS Key Benefits:

- Interoperability
- Improved user safety
- Increased efficiency of diminishing resources
- Enhanced wireless coverage
- Enhanced disaster communications capability
- Economies of scale and scope

#### Shared Governance:

- Partnering jurisdictions approved a "Participating Agency Agreement"
  - In it, the San Diego County Board of Supervisors authorized the RCS Board of Directors to administer the RCS system
- Member agency representatives select the RCS Board of Directors
  - The Board comprises 13 members at the Chief/Department Head level from fire, law, public service, representing their peer agencies.
  - No politicians are on the Board of Directors
- The San Diego Sheriff's Dept. Wireless Services Unit manages day-to-day operations
  - The Board of Directors provides administrative direction and oversight

#### Affiliates - Cost

- Parties on RCS include local, county, state and federal participants
  - CalTrans has been a significant participant on the RCS system since its inception
  - CHP's El Cajon Area Office utilized the RCS system for over a year
- Agencies may join as equity partners or as customers
- Affiliates currently comprise 217 agencies and 14 dispatch centers receiving RCS service and employ over 18,000 user radios
- Initial San Diego County network cost - \$41 million (approx.)
- Participants share ongoing network operating costs
  - The Current Network Operating Charge (NOC) is \$26.50 per radio/month
- Estimated system life is more than 15 years.

#### Operation & Coverage Area

- Use began mid-1998 with 5,177 users
- The original service area was SD County (4,200 mi<sup>2</sup> land area)
- It has since been expanded to include Imperial Co. (4,175 mi<sup>2</sup> land area)
- The Yuma Marine Air Station (AZ) is an out-of-state user.

#### New Funded Projects & Federal Assistance \$'S Secured Through Successful Sharing:

- Rectify coverage loss area between the Encinitas Power Station Site and the Mt. Soledad Site (\$1,306,450)
- Rectify busies in the RCS South Loop (\$2,030,762)
- Increase capacity in the eastern RCS coverage area reflect known shortcomings being solved (\$9,000,000)
- Provide interoperability across federal system platforms (\$2,153,000)
- Provide an interoperability connectivity conduit for public safety through two counties (\$8,000,000)

#### The RCS system success has attracted Federal assistance \$'s:

- Urban Area Security Initiative (UASI) FEMA Grant (\$4.5 million)
- Office of Community-Oriented Policing Services (COPS) Grant (\$6.0 million)

#### Technical Summary – Voice

- Motorola SmartZone 800 MHz
- Trunked, simulcast
- Mixed mode analog/digital
- Not APCO 25
- Embassy switch
- IMBE voice coder
- Digital encryption capable
- Extensive geographical coverage
  - Currently 47 microwave repeater site)
  - Two simulcast cells (18 repeaters)
  - 29 stand-alone, non simulcast repeaters (mountainous areas)
- Over 150 frequency pairs (POWER OFSHARING!)
  - 12.5 KHz, 821 MHz (NPSPAC)
  - 25 KHz, 806 MHz
- 95% coverage performance requirement
  - Performance exceeds 97%

#### Technical Summary – Data

- Voice and data systems are separate networks
- 29 repeater sites
- Motorola 800 MHz
- 19.2 KBPS
- RD-LAP Protocol
- Supports other frequency spectrum
- Permits various data applications, including AVL
- Data network provides significant growth capability
- 95% coverage requirement; exceeds 97%

For further information, call:

Chris Hinshaw, Manager  
Wireless Services Unit  
Communications Division  
San Diego Sheriff's Department  
Voice: (858) 694-3663  
Email: [chris.hinshaw@sdsheriff.org](mailto:chris.hinshaw@sdsheriff.org)

#### Board of Directors

- Chief Darrell Jobes, East County Fire Protection District (Chair)
- Chief Thomas Zoll, Carlsbad Police Department (Vice Chair)
- Herman Reddick, San Diego County Office of Emergency Services
- Commander Robert Apostolos, San Diego Sheriff's Department
- Ali Zolfaghari, California Department of Transportation
- Chief Erwin Willis, Rancho Santa Fe Fire Protection District
- Ron Fuller, Heartland Communications Facility Authority
- Timothy Purvis, Poway Unified School District
- Bob Pfohl, Santee Fire Department
- Sheriff Harold Carter, Imperial County Sheriff's Department/IVECA
- Charles Beard/IVECA Project Manager
- Chief Carlos Escalante, Calexico Fire Department /IVECA
- Chris Hall, Calipatria Fire Department/IVECA

#### **Los Angeles Regional Tactical Communications System (LARTCS)**

In Los Angeles County alone, there are 35 Fire Departments and more than 85 local, state, and federal Law Enforcement agencies. Meeting the radio spectrum needs of these first responders has long been an issue in the densely packed Southern California radio basin<sup>1</sup>, which stretches from Point Conception in Santa Barbara County, to beyond the US-Mexico border. In addition to the spectrum available to public safety users statewide, between 1978 and 1985 the Los Angeles

---

<sup>1</sup> The geographic features of Southern California / northern Baja California, Mexico create an environment where legitimate radio users south of the US/Mexico Border routinely interfere with legitimate public safety and business/industrial radio users in Southern California (likewise, users along the coast in Southern California interfere with each other, as well as users located in the Southern California mountains interfering with users located in the flatlands below. This problem is compounded by the fact that the US and Mexico have different regulatory paradigms for the use of the same spectrum blocks.

area was successful in obtaining the shared use of 3 TV channels<sup>2</sup> (14, 16, and 20) to provide spectrum relief.

Following the attacks of September 11, 2001, the senior Law Enforcement and Fire officials in Los Angeles County chartered a multi-agency working group consisting of local, state (including CHP and OES), and federal agencies to meet and address how the Los Angeles region could improve its interoperability within L.A. County, and reach out to the first responder agencies in the five contiguous counties. A short-term "quick fix" goal was to have command-level interoperability in place before the first anniversary of the terrorist attacks.

In the late spring of 2002 the working group met and examined their available resources:

- The County of Los Angeles had a number of "ACU-1000" audio gateway devices available for use, as did the US Secret Service.
- Dedicated radio control circuits existed between the CHP Southern Division dispatch center in L.A. and the L.A. County Sheriff's Communications Center, and between the L.A. County Fire dispatch and L.A. City Fire dispatch centers.
- The US Secret Service and L.A. County had radio sites across the road from each other on one mountaintop, with dedicated microwave links back to the respective agency's dispatch centers.
- Agency specific and common ('Mutual Aid') radio channels available for use with the gateways were identified.
- Spare base station radio equipment was identified.

Within 30 days of the date of the initial working group meeting:

- ACU-1000s were installed at the L.A. County Sheriff's Communications Center and the US Secret Service radio site.
- A communications cable connecting the L.A. County and US Secret Service radio sites (allowing for interconnection of the ACU-1000 units) was installed.
- The spare base station equipment was installed at the US Secret Service site, operating on a common 'Mutual Aid' frequency.
- L.A. City and CHP channels were connected to the ACU-1000 at L.A. Sheriff's Communications Center.
- Systems were connected across all platforms within one month.

Since the summer of 2002:

- LARTCS Executive Committee has been established, along with Technical and Operations Working Groups.
- Governance and Operation documents have been developed and adopted.
- Additional agencies have contributed frequencies and joined the System (there are now more than 90 agencies signatory to the LARTCS Memorandum of Understanding) .
- Plans for the construction of an expanded network to allow for multiple communications paths have been developed.
- A second ACU-1000 has been installed at L.A. County Sheriff's Communications Center.
- Discussions for interconnection to the surrounding counties are underway.

---

<sup>2</sup> In the late 1970s the FCC authorized the sharing of unused television channels for two-way radio use in the 13 largest metropolitan areas (including Los Angeles and the San Francisco Bay Area) to provide relief for overcrowded spectrum in both the public safety and business / industrial radio services. TV Channels 14-20 are used for this purpose, as they are immediately adjacent to the 450-470 MHz two-way radio spectrum allocation.



- Connections to Orange County's network have been installed.
- "Train The Trainer" courses on system operation for the street-level first responder are conducted regularly.

### **Sacramento Regional Radio Communications System (SRRCS)**

- This is an 800 MHz simulcast Motorola Smartnet II trunking system that was formed by combining the Sacramento City and County systems.
- The System is being upgraded to an APCO Project 25 type system.
- There are two separate subsystems: one voice and one data.
- There are approximately 45 different entities on the system including: Local Hospitals, Police, Sheriff, and Fire. Other entities include: Sacramento International Airport, Main County Courthouse, Carol Miller Justice Center, Family and Civil Court, Executive Airport, Main Jail, Sacramento City Police Department, Regional Transit and the Cities of Folsom, Galt, Elk Grove, Davis, and West Sacramento. State users include Cal Expo Police, CHP and CalTrans. These entities utilize a total of approximately 20,000 pieces of end-user radio equipment on the system.
- CalTrans has joined the system as a primary user and currently has approximately 25 radios in use on the system.
- The system is compatible with CalTrans trunking radio equipment statewide.
- The SRRCS is governed by the Systems Management Group (SMG). Technical issues are resolved by the Technical Advisory Committee (TAC). CalTrans is a voting member of each committee.
- Issues are discussed in an open forum and resolved on a consensus basis. If a resolution cannot be agreed upon, then a formal vote is taken (one vote per unit on the system).
- The committee is currently exploring the merits of using the upcoming 700 MHz band, among other options.

### **CalTrans/CHP Partnership: Transportation Management Center (TMC)**

One example of partnership between the California Department of Transportation (CalTrans) and the California Highway Patrol (CHP) is through the Transportation Management Center (TMC). A TMC is essentially the nerve center for the collection and dissemination of transportation information, where representatives of the CHP and CalTrans collaborate to effectively manage the transportation system. With the increase in the number of vehicles and miles traveled on California's highways, TMCs support sophisticated transportation management of the existing infrastructure, essential to achieving mobility and system efficiency. The TMC is the backbone of the Traffic Management System (TMS), which is designed to efficiently manage existing infrastructure, mobilize assets, and field personnel (i.e. Freeway Service Patrol (FSP), maintenance crews, and Traffic Management Teams). The TMCs actively manage the state's transportation system to minimize congestion and provide the safe and efficient movement of people, goods, services, and information. Eight TMCs are in operation throughout California. They are co-managed by both the CHP and CalTrans. A wide area communications system is required to support the TMC, as stated in the goals and objectives of this report.

Another example of CalTrans and CHP partnership is through a frequency use agreement. The agreement enables CalTrans field staff to operate on CHP's frequencies when communications are required between the two Departments. The agreement facilitates a more effective and efficient means of communications between CalTrans and CHP, especially during emergencies or major events. Also, the CHP utilizes CalTrans radios to communicate with CalTrans staff.

### *California Fire Service Efforts*

Following the disastrous Southern California fires of September 1970, Congress funded a multi-agency pilot program to address inter-agency coordination on Wildland-Urban intermix fires. This program, called Firefighting REsources of Southern California Organized for Potential Emergencies” (FIREScope) developed the Incident Command System (ICS) and the Multi-Agency Coordination System (MACS), established standards for types of equipment, and established a standardized minimum list of radio frequencies that fire apparatus (industrial, local, state, and federal) in the State of California Fire and Rescue Mutual Aid system should be capable of operating on (in addition to the owning agency’s normal frequencies). As the original FIREScope partner agencies (US Forest Service, CDF, OES, Los Angeles County FD, Los Angeles City FD, Ventura County FD, and Santa Barbara County FD) bought new communications equipment, the standard list of frequencies was programmed.

In the late 1980s the Legislature extended the FIREScope Program to encompass all of the State of California, and in 1992 ordered the inclusion of ICS and MACS in the newly developed Standardized Emergency Management System required to be adopted by all State agencies, and recommended for adoption by all other participants in the state’s Mutual Aid systems.

A survey following the October 2003 Firestorms in Southern California showed that this 30-plus year effort of coordination and collaboration within the Fire Service has paid off, as the great majority of firefighting resources have capability in the VHF-Hi spectrum to allow for common communications on scene at incidents, and most of those agencies who do not have VHF-Hi capabilities in every piece of equipment have VHF-Hi capabilities in the Chief Officer’s vehicles, providing command-level interoperability with an incident.

## Appendix E

### Detailed Evaluation of 1997 & 1999 CA Reports

1. *Partnering for the Future: A Strategic Plan for California's Public Safety Radio Communications*, January 1997 (PRISM Report Executive Summary)

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
VISION FOR THE FUTURE					
	A robust public safety communication infrastructure is a critical component of the State’s public safety mission. State must move rapidly and decisively to meet targeted goals for universal statewide access, improved interoperability, enhanced functionality, and adequate channel availability.	X			California should move quickly and decisively to begin the phased implementation of statewide public safety voice and data radio communication systems.
	These systems should be designed to consist of multiple voice and data networks optimized to meet the unique requirements of the 10 participating agencies, as well as common requirements.	X			These sub-systems may utilize multiple technologies and spectrum bands, maximizing spectrum efficiency and leveraging existing infrastructure investments wherever possible.
A COMPELLING CASE FOR CHANGE					
Existing Systems Failing	Lack of interoperability	X			Bring up to date (i.e., with more recent examples such as the 2003 San Diego Firestorm; rolling blackouts, tsunamis, earthquakes, and with current data such as new narrowbanding deadlines).
	Channel congestion	X			
	Aging Equipment	X			
	Limited functionality	X			
Risks of deteriorating communications	Endangerment of Field Personnel	X			Without effective and reliable public safety radio communications, Californians, and those sworn to protect them, are put at significant risk.
	Lower Levels of Service	X			As existing communication systems become overcrowded and compromised by age, the State’s public safety agencies lose their ability to effectively communicate with dispatch and other field personnel. Without coordination, response times lengthen and multi-agency responses become confused and inefficient.
	Obsolescence	X			
	Inability to Support Future Growth	X			Without additional spectrum resources or a migration to newer spectrum efficient technologies, current systems will be unable to accommodate California’s future growth.
A Narrowing Window of Opportunity	Competition for Spectrum Resources	X			The State of California is facing a unique window of opportunity to make desperately needed improvements in public safety radio communications. Increasing competition for spectrum resources, new regulations governing wireless communications, rapidly changing technologies, and rising costs quickly are narrowing that window of opportunity.
	Changing Regulations	X			
	New Technologies	X			
	Rising Costs	X			

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
California's Response	Recognizing the need to take advantage of this narrowing window of opportunity, the State's 10 largest public safety agencies and the Department of General Services Telecommunications Division initiated a collaborative effort to develop a statewide strategy for public safety radio communications.	X			The critical problems crippling California's public safety radio systems present a compelling case to move toward a new shared vision for the State's future communication infrastructure.
<b>A VISION FOR PUBLIC SAFETY RADIO</b>					
Universal, Statewide Access	Basic communication capabilities must be available to every public safety service provider as he or she travels throughout the State during both routine and disaster operations.	X			Reliability, statewide coverage, universal access to dispatch and affordability are necessary to provide state public safety agencies with universal, statewide access to radio communications.
Reliability	Public safety agencies require reliable communication systems which are engineered and maintained to withstand natural disasters and other emergencies.	X			In addition, antiquated infrastructures and aging equipment must be replaced to avoid compromising the reliability of systems.
Coverage	Mobile radio coverage is required to support operations that travel through diverse terrain and multiple service areas. Portable radio coverage is required to support public safety operations that extend out to remote areas and inward through urban canyons, concrete buildings and basements.	X			
Universal Access to Dispatch	Dispatch services are critical to coordinating field resources, providing access to criminal justice and other information, and linking field personnel with assistance during emergencies on disaster situations.	X			
Affordability	Communication systems must be cost efficient with respect to both one-time procurement costs and recurring maintenance costs. Replacement parts and components must continue to be available through the system's expected lifetime.	X			Increasing costs of technology and the growing need for government to do more with less has made acquiring the necessary funding for capital improvements exceptionally difficult. No state agency will have access to the selected communication solutions unless it is affordable.
Improved Interoperability	The ability to communicate between and among public safety agencies is fundamental to the effective protection of life and property.	X			Future interoperability will require both technology dependent and technology independent solutions.
Technology Dependent Solutions	Technology dependent solutions utilize dedicated equipment to establish a link between two or more separate communication systems. Gateways are one technology that may provide a viable short-term solution to interoperability.	X			Gateways can interconnect systems operating in different frequency bands, modes of operation and manufacturer protocols. Broadband, dual-band and multi-band radios are a second potential solution to achieve interoperability among multiple spectrum bands; however, commercial availability is currently limited.
Technology Independent Solutions	Technology independent solutions achieve interoperability by providing a common communication path to all radio users. The mutual aid systems maintained by the State provide common frequencies for use during disasters and other multi-agency responses.	X			Shared or consolidated systems allow multiple agencies to operate in the same frequency band using compatible equipment on the same infrastructure.
Enhanced Functionality	While voice radio communication remains the primary form of information transfer among public safety agencies today, data and image transmissions will account for a majority of all public safety communication by 2010.	X			Increasingly, state agencies will rely upon mobile data communication and video transmission technologies to increase the safety, efficiency and productivity of field personnel.
Mobile Data	In the future, mobile data may be required to support such federal initiatives as the Integrated Automatic Fingerprint Identification System (IAFIS) and the National Crime Information Center (NCIC) 2000 project.	X			These and other emerging applications will allow law enforcement and other public safety professionals to check fingerprints, outstanding wants and warrants, and other critical information instantly.

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
Video Transmission Technologies	An increasing frequency of high risk incidents such as narcotics surveillance operations, prison riots and public disturbances have increased for all public safety agencies the requirement for video transmission technologies.	X			
Channel Availability	In California, radio spectrum congestion and interference cause some public safety personnel to wait several minutes to access a voice communication channel.	X			Additional spectrum, greater spectrum efficiencies and system expansion are required to ensure California's public safety personnel have immediate access to communication channels.
Additional Spectrum	Additional spectrum is needed to reduce the current congestion of public safety voice channels in California and ensure that field personnel have available communications during emergencies as well as routine operations. In addition to any new spectrum allocations, the State should continue to utilize existing VHF high band frequencies from 150 MHz to 174 MHz to leverage current infrastructure and to support wide-area interoperability. Frequencies in the 800 MHz range also will continue to provide for special applications.	X			The State should monitor closely federal spectrum re-allocation activities and be prepared to take advantage of any new available spectrum.
Spectrum Efficiencies	Narrower channels, digital transmission and trunking approaches have the potential to dramatically increase the number of users that can be supported by a single channel.	X			More efficient use of spectrum can be achieved through a migration to currently available spectrum efficient technologies. Additionally, system sharing can provide the opportunity to more efficiently utilize limited radio frequencies.
System Expandability	Public safety systems demand flexibility and quick expandability to accommodate peak use. Although normal day-to-day operations may not require high capacity, during peak operations or disaster situations many new users may come on the system simultaneously. In addition, California requires expandability to accommodate future demand patterns.	X			This is especially true of emergency management and disaster services, which are characterized by very low levels of voice traffic during routine operations, but extremely high levels during a major event such as an earthquake, flood or wildland fire.
<b>COMPETING PARADIGMS</b>					
Lowest Cost Alternative	Do nothing differently than it is done today. Each of the State's public safety agencies currently works with the Department of General Services to operate and maintain independent, and often duplicative radio systems. Minimal infrastructure and equipment investments are made as they can be afforded, grants are awarded, funding can be "borrowed" from other budget items, or as disaster funding becomes available.			X	Detailed 1999 Cost Benefit Analysis reveals costs for this alternative were \$63,385,000 for the 1997-1998 fiscal year. Assuming a modest 5% per annum increase, this would total <b>\$1.4 billion over 15 years</b> . However, this is not an achievable alternative because all current systems are out-of-date and are either (1) not supportable, or, (2) not compatible with current or future state agency or regulatory agency requirements or mandates; or both..
Highest Cost Alternative	CA continues its present individually developed and funded departmental radio operations. Meeting the current needs of state public safety in this current paradigm of independent procurement and development requires funding each agency independently to replace aging and obsolete voice system infrastructure, procure additional equipment necessary to equip those field officers currently without radio communications, and implementing statewide mobile data capabilities.			X	Detailed 1999 Cost Benefit Analysis reveals costs for this alternative will approximate <b>\$4.3 billion over 15 years</b> .

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
Shared Systems' Alternative	CA elects to meet its strategic goals for public safety radio by making coordinated investments in shared radio systems offering greater opportunities to achieve cost efficiencies through the reduction of duplicate infrastructure, streamlined maintenance structures and greater leverage in equipment procurements. Shared communication systems provide the most reliable means of achieving direct interoperability among multiple agencies. By demonstrating a commitment to shared systems and efficient use of frequencies to the FCC, California will increase its chances of acquiring the additional necessary spectrum resources.			X	Detailed 1999 Cost Benefit Analysis reveals costs for this alternative will approximate <b>\$3.5 billion over 15 years.</b>
<b>A Strategy for the Future</b>					
Partnership Among State Agencies	Even the largest agencies can no longer afford comprehensive communication solutions alone.	X			The partnership among state agencies that was established with this collaborative strategic planning effort must be maintained to achieve strategic advantages in the future.
Partnership with Private Industry	While no private provider cost effectively offers the level of reliability, statewide coverage, priority access and security that California's state agencies require from their primary communication systems, commercial services can and do play an important role as an adjunct to public safety communications.	X			
Partnership with Local Public Safety	Californians will benefit from more efficient, coordinated emergency response only when public safety at all levels of government can effectively communicate during daily operations as well as major disasters.	X			This will require a strong partnership among state and local public safety agencies.
<b>RECOMMENDATIONS</b>					
Systems and Technology	Develop a Shared, Statewide Voice Radio System: The system should be designed to consist of multiple voice networks optimized to meet the unique requirements of the participating agencies. These sub-systems may utilize multiple technologies and spectrum bands, leveraging wherever possible existing infrastructure investments.			X	A shared system still holds advantages that can be applied to improve interoperability among the agencies during emergencies and disasters, as well as to support day-to-day operations. Its application compared to a system of systems will need additional study.
	Develop Statewide Mobile Data Capabilities	X			This system will support high priority, rapid response data transmissions such as database inquiries, automatic status updates, electronic messaging, field reporting, interface with computer aided dispatch systems and emergency alerting.
	Collectively Pursue Additional Spectrum Resources	X			By demonstrating a commitment to the shared use of frequencies, California can more persuasively argue for additional spectrum.
	Optimize Spectrum Efficiency and Enhance Interoperability	X			A new system configuration (or system of systems) should be designed to optimize spectrum efficiency and performance through the coordinated migration to narrowband and digital technologies. The latest technologies available for public safety wireless voice communications, such as trunking, should be implemented consistently among the agencies in select areas of the State to enhance cost effectiveness and interoperability.

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
Systems and Technology (continued)	Pursue Phased Implementation	X			Each completed phase of the system implementation should provide a complete and functional portion of the eventual communication infrastructure. Also applies to "system of systems". A phased implementation can accommodate changes in time frames, agency requirements and technology without requiring a comprehensive re-engineering of the system.
	Coordinate New Voice Radio System with Existing Mutual Aid Systems	X			Federal, state and local public safety agencies rely heavily on the State's existing mutual aid radio systems. Any new statewide system should provide for continued interoperability with these mutual aid systems.
	Continue to Accommodate Specialized Requirements	X			Video communications, telemetry and surveillance are examples of these specialized requirements which the State's target communications environment is not specifically designed to accommodate.
	Utilize Commercial Services to Meet Unique Requirements	X			Cellular telephone communications, paging services, high volume data applications and satellite communications are all examples of telecommunications capabilities that can be effectively provided by commercial providers.
Administration and Ownership	Maintain State of California System Ownership	X			No commercial provider currently offers the level of performance, reliability, coverage, priority access, security and affordability that the State's public safety agencies require.
	Pursue Design and Installation Partnership	X			Whichever system approach is used (or system of systems), during the design phases, department engineers will provide knowledge of existing systems and conditions; in turn, vendor engineers will begin the knowledge transfer that will allow the Department to assume system maintenance and engineering responsibilities. During the installation phases, Department employees will be able to monitor installation practices and become familiar with the installed equipment; vendor installation teams will be able to leverage the State's knowledge of sites and facilities, and be able to utilize the State's existing manpower resources. Coordination w/local partners & CALSIEC will be key with any actions.



REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
	Maintain Planning Committee as an Advisory Body to the Department of General Services	X			The Public Safety Radio Strategic Planning Committee should continue to play an active role in advising the Director of General Services on strategic direction, system administration, user requirements and priority setting for public safety radio communications. The Planning Committee should be comprised of representatives from the user agencies as well as the Telecommunications Division. Other agencies in addition to DGS will need to be included prominently.
	Coordinate Site and Facility Management and Develop Standards	X			Identification and standardization of facility requirements will help ensure the availability and performance of remote sites.
	Maintain User Agency Administrative Control	X			User agencies should retain responsibility for some aspects of administrative control over radio systems. Specific tasks such as key control for encrypted communications will require this direct administration for security and accountability.
Maintenance and Support Services	Continue to Provide Maintenance through Department of General Services Telecommunications Division	X			The Division's cost effective responsiveness to client requirements has been demonstrated consistently during recent years. The State should continue to outsource the maintenance of system components when their complexity or proprietary nature requires specialized expertise, and where it can be demonstrated private service providers can cost effectively meet the State's standard of performance.
	Provide DGS Staff with Ongoing Training and Updated Equipment	X			The ability to provide support on a statewide basis to these critical public safety radio systems is essential to their reliability and overall performance.
	Extend Standard Practices for Vendor Installation.	X			To ensure compliance, installation standards should be included in the acceptance criteria for completed work.
	Expand Efforts to Pursue Public Safety Communication Interests	X			The State should take a proactive role in promoting public safety communication needs to achieve the necessary interoperability at local and federal levels.
	Pursue Improvements in the Procurement Process	X			Current bid processes and contract procedures lead to time delays, increased costs and less-than-optimal technological solutions. The State should pursue improvements in the procurement processes aimed at reducing the cycle time of equipment and service selection.
	Implement Formal Project Tracking Procedures	X			These procedures and tools should track planned and actual project costs and schedules and provide a basis for further planning and cost estimation efforts.
Organization and Staffing	Appoint a Full-Time Project Manager and Provide Support Resources	X			The project manager should be provided with the necessary staff and technical resources to accomplish the required oversight.

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
	Establish Ad Hoc Task Forces to Address Critical Path Issues	X			The State should immediately establish task forces within the Planning Committee to address Funding, Spectrum Acquisition, System Design and Procurement, and Public Relations tasks.
	Identify Required Agency Resources	X			Participating agencies should be prepared to allocate substantial time and internal resources to this project. User agency participation in design and implementation is critical to ensuring that the unique requirements of the agencies are met.
	Identify Required Department of General Services Resources	X			Specific resource requirements should be quantified early and options for meeting these requirements with a combination of existing and outside resources identified. The State may wish to consider allocating the required resources to a dedicated organizational unit within the Telecommunications Division to focus on supporting the implementation and transition to the State's radio communications vision.
	Retain Outside Assistance	X			Specialized legal, technical, design, quality assurance, financial and project management skills may be necessary during system design and implementation.
<b>Critical Success Factors</b>					
Critical Success Factors	Commit to Long-Term Interagency Participation	X			Each of the participating agencies must demonstrate a solid commitment to continuing interagency cooperation and integrated planning.
	Establish Long-Term Funding	X			Current systems must be maintained at a level that will enable them to support the state agencies' missions. New shared system infrastructure will require additional long-term funding.
	Redefine the Role of Department of General Services Telecommunications Division	X			Externally, the Telecommunications Division will be required to support efforts to represent the State's interests in national forums. Internally, the Division will be directly accountable to user agencies for communicating progress and managing projects on time and within budget.
	Establish Processes for Requirements-Driven Justification	X			New technologies must demonstrate an ability to cost effectively meet specific operational requirements before their adoption. User agencies will evaluate the effectiveness of implemented solutions in meeting their unique needs.
	Provide Comprehensive Training	X			The introduction of new technologies will require training for both end users and support staff to keep up with the pace of technology and fully utilize the capital investments.

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
	Update Operational Processes and Procedures	X			New or revised procedures will be required as new opportunities for interoperability alter daily operations and many tasks become automated with the implementation of mobile data and other technologies.
	Continue Operational Autonomy and Flexibility	X			Interoperability should not come at the expense of cumbersome rules or configuration constraints which limit individual agency initiatives. In addition, the agencies will require enough flexibility in the procurement and implementation processes to target open architectures and integrate new technologies as they become available.
	Seek Opportunities for Local Participation	X			The State's vision provides a platform to meet global public safety agency interoperability requirements. The ability to gain local support for the project will become a cornerstone of its success.
	Leverage National and Other State Efforts	X			National and state initiatives for emergency communications systems and use of satellite technology may provide additional leverage and cost efficiencies.
	Continuously Communicate Project Goals and Risks	X			Building support for the project will require broad communication of anticipated benefits as well as a realistic portrayal of potential risks.
<b>ACTION PLAN</b>					
Communicate the Strategic Plan to Stakeholders	Specific work steps should include: <ul style="list-style-type: none"> <li>Coordinate the publication and distribution of the Plan.</li> <li>Develop and conduct department and internal executive briefings</li> </ul>	X			The Planning Committee should begin to communicate the Strategic Plan to participating agency executives and staff as well as the Governor's Office, Legislature and the Department of Finance in an effort to build early support for the project.
Prepare Feasibility Study Report (FSR)	Specific work steps should include: <ul style="list-style-type: none"> <li>Finalize detailed requirements</li> <li>Conduct detailed alternatives analysis</li> <li>Prepare cost analysis of alternatives</li> <li>Determine most feasible alternative</li> <li>Develop management plan</li> <li>Conduct Feasibility Study</li> </ul>			X	The State should conduct a cost analysis and feasibility study of system design alternatives; however, an FSR may not be the appropriate vehicle.
Pursue Spectrum Allocation	Specific work steps should include: <ul style="list-style-type: none"> <li>Coordinate with the Federal Communications Commission, frequency coordinators, and appropriate industry associations</li> <li>Monitor relevant PSWAC and FCC developments</li> <li>Develop license application, detailing specifics of spectrum use, migration strategy and build-out commitment</li> </ul>	X			Additional discussion with the Federal Communications Commission and frequency coordinators should take place to finalize spectrum allocation requirements and identify any future design constraints.

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
Develop a Funding and Finance Strategy	Specific work steps should include: <ul style="list-style-type: none"> <li>Identify Department of Finance requirements</li> <li>Finalize detailed budget projections</li> <li>Identify capital funding sources</li> <li>Draft preliminary cost allocations</li> <li>Identify agency capabilities and support</li> <li>Identify financing options</li> </ul>	X			Whichever 'system of systems' approach is used, successful migration to the State's vision will require significant investments in system infrastructure. The Planning Committee and the Department of General Services should identify the most appropriate sources of capital funding and finalize financing arrangements for the chosen system approach.
Review Evolving Committee Roles and Responsibilities	The existing Strategic Planning Committee has provided an effective forum in which user agencies participate directly in ongoing planning efforts. The Committee should continue to advise the Department of General Services in functional system design, spectrum acquisition, funding strategy development and system selection documentation. As this project progresses from detailed planning to implementation phases, the Committee should review its role and responsibilities.	X			It is anticipated that the Committee will evolve to a more formal governance structure as system implementation demands more formal procedures for introducing new system users, assigning cost allocations, resolving disputes and prioritizing new and changing system requirements.
Finalize System Design and Prepare Specifications	Specific work steps should include: <ul style="list-style-type: none"> <li>Finalize detailed operational requirements and specific criteria for performance, equipment, and testing and acceptance</li> <li>Finalize system features and equipment quantities</li> <li>Develop contractual terms and conditions</li> <li>Draft Request for Proposal</li> </ul>			X	The State should develop a Request for Information (RFI), then a comprehensive Request For Proposal (RFP) to begin the procurement of the new voice and data radio communication systems. The scope of the RFP should include detailed needs and requirements as well as minimum system performance standards.

2. April 1999 Cost Benefit Analysis for California's Public Safety Radio communications Project:

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
PROBLEM STATEMENT					<b>Note:</b> This is virtually identical to the ISSUES listed under the Strategic Planning REPORT SECTION in the previous table above titled “A COMPELLING CASE FOR CHANGE”. The reader is referred to that Section for DETAILS.
	<b>Lack of interoperability; channel congestion; aging equipment; limited functionality; narrow windows of opportunity</b>	X			This problem statement remains valid.
BACKGROUND					<b>Note:</b> This is virtually identical to the ISSUES listed under the Strategic Planning REPORT SECTION in the previous table above titled “COMPETING PARADIGMS”. The reader is referred to that Section for CONCLUSIONS and DETAILS.
	Maintain Status Quo: <ul style="list-style-type: none"><li>This assumes maintaining the existing systems, and making no further investments in capital improvements to the systems.</li></ul>			X	Detailed 1999 Cost Benefit Analysis reveals costs for this alternative were \$63,385,000 for the 1997-1998 fiscal year. Assuming a modest 5% per annum increase, this would total <b>\$1.4 billion over 15 years. However</b> , this is not an achievable alternative because all current systems are out-of-date and are either (1) not supportable, or, (2) not compatible with current or future state agency or regulatory agency requirements or mandates; or both.
	Pursue Agency Independent Initiatives: <ul style="list-style-type: none"><li>This alternative assumes that the State departments would pursue the acquisition of systems that would support their unique needs. They would do so independent of what other departments may or may not be doing to enhance their own communications systems.</li></ul>			X	Detailed 1999 Cost Benefit Analysis reveals costs for this alternative will approximate <b>\$4.3 billion over 15 years.</b>
	Pursue Shared Infrastructure: <ul style="list-style-type: none"><li>This alternative assumes that the State departments would pursue the acquisition of a shared radio infrastructure to support their unique needs in partnership with other State departments.</li></ul>			X	Detailed 1999 Cost Benefit Analysis reveals costs for this alternative will approximate <b>\$3.5 billion over 15 years.</b>
RECOMMENDATIONS					
	The State Cannot Maintain The Status Quo	X			Technology changes, resulting in manufacturers no longer supporting equipment in certain portions of the spectrum, and federal mandates, such as narrow-band spacing requirements, will not allow continued use of current baseline technologies. Without a major replacement of the existing systems, radio communications will be severely compromised. This condition will continue to place the citizens of California, and those sworn to protect them, at risk.

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
	The State Cannot Afford The Development Of Independent Systems			X	Although the development of independent systems by the State departments would address many needs, it may cost more than the implementation of a shared infrastructure. As written in the 1999 analysis, this independent approach does not enhance critically needed interoperability nor does it promote operational efficiencies. The departments also will have difficulty acquiring additional spectrum from the FCC (which is requiring more shared systems) to alleviate channel congestion. Elements of both independent and shared system options make up the 'system of systems' recommended approach today in 2005/6
	<p>Shared Systems Will Most Cost Effectively Meet The State's Needs:</p> <p>The implementation of a shared, statewide, public safety radio communications infrastructure should be designed based on the following criteria:</p> <ul style="list-style-type: none"> <li>Hybrid of voice and data networks to meet geographic and operational needs</li> <li>System design and optimization to meet agency-unique operational requirements</li> <li>Use of digital technologies for improved operational capabilities, security and spectrum efficiency</li> <li>Operation in multiple spectrum bands, utilizing modern switching technologies, to maximize cost effectiveness and operations</li> </ul> <p>Use of existing facilities and equipment to the maximum extent possible, reducing overall costs</p>			X	Based on a detailed analysis of the various technology and spectrum alternatives, the PSRSPC in 1999 concluded that the new system's infrastructure should be developed with a hybrid backbone, using both VHF and UHF spectrum. This approach maximizes the cost effectiveness of the system by taking into account both the varied terrain of the State and the available spectrum, as well as by leveraging existing systems. Also, by using advanced switching technologies, the equipment that routes and connects communications transmissions, the hybrid approach should allow for full interoperability among the system users, enhancing effectiveness and safety. <i>To fully use the serviceable life of existing equipment, departments will migrate to the new infrastructure as their current equipment becomes obsolete and more cost-effective to replace. Elements of both the independent and shared systems approaches outlined in 97 &amp; 99 apply today and the best of each should be identified and integrated today in 05/06</i>
<b>BENEFITS</b>					
	Increased ability of public safety professionals to accomplish their missions	X			A comprehensive, shared radio communications infrastructure or 'system of systems' with similar attributes will increase operating efficiencies for all the participating departments. Risks to field personnel decrease as faster access is gained to vital information. State-of-the-art digital and trunking communications systems provide rapid simple access to information and resources that enhance personnel safety and allow the departments to better accomplish their missions.



REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
	Improved Ability To Directly Interoperate With Mutual Aid Cooperators	X			A shared infrastructure will allow departments to communicate directly with their mutual aid partners without requiring the use of multiple radios or complex technical solutions. Interagency coordination is made easier by a reduction in equipment, and information is more easily transferred in a direct fashion with fewer errors and delays. By enabling direct interoperability among participating departments, the public will receive better, and more timely, coordination of public safety services.
	Faster, More Accurate Access To Information	X			The shared data system promotes the rapid, direct transfer of information to personnel in the field and among departments. Direct data access removes the potential for errors in verbal transmission. This direct information transfer promotes greater safety and operating efficiencies, thereby increasing timely service levels to all those supported by the participating departments.
	Ability To Support Continued System Growth Through The Deployment Of Mobile Data	X			As the number of radio users increases, there will be more and more demand for voice communications channels. Using a mobile data system will provide more capability for voice communications by moving routine data traffic onto a more efficient medium (digital data transmission).
	Ability To Reduce Channel Congestion	X			By combining operations onto an integrated infrastructure, State radio users will enjoy the benefits of operating in a trunked environment, where access to channels is improved. Trunking helps reduce channel congestion by providing the ability to dynamically manage channel resources while maintaining operational separation among user departments.
	Improved Cost Effectiveness	X			The development of a shared infrastructure or similar 'system of systems' will reduce the amount of required facilities and equipment, resulting in significant cost savings. It will also result in a reduction in spare parts inventories and the types of equipment requiring service. By reducing the types of equipment requiring maintenance, the overall training required for maintenance providers will decrease. Thus, the cost associated with supporting a qualified maintenance force will be reduced. Consolidation of sites means fewer trips to separate locations, improving the use of this staff. As the 2005/6 strategic plan is applied, these benefits and goals will be continuously used as benchmarks today.
COST					

REPORT SECTION	ISSUE OR CONCLUSION	DOES THIS STILL APPLY TODAY?			DETAILS OR THOUGHTS...
		Yes	No	TBD	
	<p>The State Should Save Over <b>\$795 Million</b> By Migrating To Shared Systems</p> <ul style="list-style-type: none"> <li>The State of California's public safety agencies are in a critical situation with failing radio communications systems that do not meet user needs. In order to correct this situation, the State must invest approximately \$3.504 billion over the next fifteen years on a new wireless voice and data communications infrastructure, user equipment and maintenance services.</li> <li>Savings should be realized through reductions in site development, fixed-site equipment, site-to-site links, maintenance requirements, as well as system design, engineering and development. In addition to the system savings, other benefits include improved functionality and universal coverage for agencies that could not afford such system improvements on their own.</li> </ul>			X	<p>If the State chooses to bypass the opportunity to address public safety communications in a cohesive, shared systemic manner, individual departments will proceed with independent system improvements. If this independent approach is followed, the 1999 study estimated that the State could invest over \$4.299 billion during the same 15 year period, resulting in excess expenditures of over \$795 million compared to the development of a shared system. These numbers will continue to be examined from an 05/06 perspective as this strategic plan is implemented today in pursuit of an integrated, system of system approach.</p>
<b>IMMEDIATE NEXT STEPS</b>					
	<p>Begin The Development And Implementation Of Pilot Projects.</p> <ul style="list-style-type: none"> <li>Pilot projects can serve to demonstrate proof of concept for technical, fiscal and operational challenges. The proposed system design and resulting cost estimates will be further validated and refined. This validation process is critical to accomplish prior to securing the necessary funding for the entire project.</li> </ul>	X			<p>Pilot projects can also assist the State with one of the other critical next steps in the project: securing the necessary radio spectrum. The State is currently faced with a narrow window of opportunity to acquire critically needed radio spectrum. In the 05/06 environment, pilots will have to be considered in coordination with the principles outlined in the strategic plan.</p>
	<p>Move Quickly And Decisively With The Federal Communication Commission (FCC) To Identify And Acquire The Necessary Spectrum.</p> <ul style="list-style-type: none"> <li>Increasing competition for spectrum, new regulations governing wireless communications and rapidly changing technologies are impacting the State's ability to provide reliable public safety radio communications.</li> </ul>	X			<p>When an organization can show proof of commitment and financial resources to implement the project, the FCC is more inclined to grant frequency licenses to support the implementation. By moving forward with the pilot projects, the State will demonstrate its commitment to begin the implementation of a shared public safety radio system.</p>
	<p>Move Forward Into The Next Phases Of The Project, And Rapidly Deploy Pilot Projects To Validate The Project Concepts And Secure The Necessary Spectrum.</p>	X			<p>The cost benefit analysis represents a significant milestone in the effort to develop a new radio communications infrastructure to meet the collective needs of the State's public safety agencies. The data will be examined and regularly applied to the implementation of the 05/06 strategic plan.</p>

## **Appendix F**

### **California Communications System History**

#### ***Recent History***

Over the last 70 years California's state and local public safety agencies have developed voice communications systems to meet their individual agency requirements, using technologies and spectrum available at the point in time each system was developed. As the population densities, topography, and land use vary in differing areas of the state, so have the communications systems of the state and local agencies providing the services varied in technology and portion of the public safety spectrum used.

The concept of having an integrated, statewide system has been around for decades in many state governments. In California, as departments have recognized the need for radio communications, systems have been developed using a variety of funding sources, operating on spectrum that was available at the time each system was originally designed and equipment procured. This has resulted in a number of independent radio systems being developed by different state departments within the same one or two segments of the spectrum.

Over the last 30 years, some local agencies have been able to develop agency-owned in-vehicle mobile data communications networks, through grant funds and the assignment of spectrum available within the local area. While some state departments have data capabilities operating on common carrier networks, state departments have had neither the funds nor the spectrum available to develop a state-owned in-vehicle mobile data network.

California has a long history of promoting and facilitating communications interoperability as an operational component of the California Master Mutual Aid System, with existing field level mutual aid radio programs. Since the 1960's field mutual aid channels have been in use, such as the CLEMARS channels for Law Enforcement use; the "White Fire" channels for interagency Fire incident communications; and CALCORD for true at-scene inter-discipline coordination.

#### ***Authorizing Statute and History***

In 1992, the FCC released the first of a series of regulatory proceedings aimed at increasing the number of discrete channels available for use in the existing Land Mobile Radio spectrum by decreasing the amount of spectrum ("bandwidth") occupied by a user's signal. This process has become known as "Refarming" in the communications industry. The initial proceeding, Docket 92-235, proposed a four-fold increase in the number of users occupying the VHF-High, UHF, and UHF-TV bands. A follow-on proceeding, Docket 99-87, set transition dates for existing communications systems to implement the newer, spectrum efficient technologies. While the exact dates for some milestones in these new regulations are being appealed, in general all legacy public safety radio systems in these bands must migrate to the narrower bandwidths in the next ten years. (Some discrete CDF, CHP, DWR and OES systems were required to be converted to narrowband operation by January 1, 2005 to comply with a separate FCC order establishing new interoperability channels). All of these conversions have not yet been accomplished.

Upon the release of Docket 92-235, a number of state departments realized the major impacts that the implementation of these new Federal policies would have on state department radio systems. In August 1993, the Director of the Department of General Services sent invitations to the Directors of the ten largest state departments with radio systems asking that they appoint a representative for a strategic planning effort aimed at developing a unified approach to migrate to narrower bandwidths. This effort commenced in 1994, and became the “*Public Safety Radio Strategic Planning Committee*.”

With the assistance of a consultant, the *Committee* developed a Strategic Plan and a Cost Benefit Analysis for the procurement and implementation of a new voice *and data* communications infrastructure to support the requirements of state departments, and its operation and maintenance through a fifteen-year lifespan. This proposal was known as the “Public-Safety Radio Integrated Systems Management” [PRISM] Project.

From the start, the Committee envisioned partnering with local agencies through either interconnecting systems at the backbone level, or by smaller local agencies subscribing to the state network and thereby enjoying the expanded coverage of a large area system. During the 2000-01 and 2001-02 fiscal years, \$3.4 million was approved to embark on the initial design and engineering work for a Phase 1 program in the ten-county Sacramento area. However, the absence of a mandate to actively develop these partnerships and the cost of the development and support of such a system clouded the issue. As a result, no further action was taken.

Following the terrorist attacks of September 11, 2001, the Legislature recognized that state departments require improved communications with each other and with federal and local counterparts, and took action. The *Public Safety Communication Act of 2002* (AB 1818 [Nakano], Chapter 1091, Statutes of 2002) (“Act”) provides the legislative mandate for the PSRSPC, and provided legislative recognition that a coordinated, consolidated effort is required for cost effective modernization. The Legislature also recognized the need for state and local public safety departments to communicate across traditional disciplinary lines.

During its work in 2003, a series of workshops were held around the state where communications modernization and interoperability was discussed at length among local, state, non-profit, and the vendor community, including CALSIEC regional groups. Documented in its *2004 Report to the Legislature*, the PSRSPC outlined the communications and interoperability challenge facing CA.

### ***Communications Organizations***

#### **The Public Safety Radio Strategic Planning Committee (PSRSPC)-Recent Activities**

As mentioned earlier, the PSRSPC is a state mandated communications organization. In June, 2005, the PSRSPC met to continue the work of the committee and to move forward on fulfilling its mandates. At the June meeting the Executive Committee elected the Director of the Office of Emergency Services to be the Committee Chair, and also re-established the Technical Working Group, as a staff support collaborative, to assist the Executive Committee in all aspects of its ongoing work. The PSRSPC-TWG met three times in quick succession between June and the September meeting of the Executive Committee. Staff from all chartered organizations of the PSRSPC has been participating in the PSRSPC-TWG. The outgrowth of this collaborative staff effort is this report and work plan. It reflects the rapid changes in the radio technology arena since the *Partnering for the Future: A Strategic Plan for California’s Public Safety Radio Communications*, January 1997 (PRISM Report Executive Summary)

### FCC Regional Planning Committees (RPCs)

These federal planning committees assist with regional planning and are partners in the state's modernization and interoperability initiatives. A brief history of the committees follows.

In the late 1980s, the FCC released 6 MHz of new spectrum at 866 MHz for public safety use, and convened the National Public Safety Planning Advisory Committee (NPSPAC) to recommend rules and regulations for the use of these new frequencies. In 1989 the FCC adopted NPSPAC's recommendations, and defined 55 geographic Planning Regions around the United States. Within California, the FCC established two Regions. Region 5 covers the 10 densely packed southern-most counties, and Region 6 covers the remaining 48 northern counties. A Convener was selected and each Region developed a Utilization Plan for the spectrum. These Plans were submitted to the FCC for public review and adoption prior to any user being able to license in the new spectrum. These committees remain in place today to handle Plan revisions and maintenance.

In 1998 the FCC ordered television channels 63, 64, 68, and 69 be reallocated to public safety communications use (creating the "700 MHz" band). The FCC again adopted the Regional Planning concept for management of this spectrum in a manner that reflects the requirements of the geographic area. Separate 700 MHz Planning Committees have convened and are developing the Utilization Plan for the "General Use" portion of the 700 MHz band in their respective areas.

### California Statewide Interoperability Executive Committee (CALSIEC)

Since the 1960s, the Governor's Office of Emergency Services (CA OES) has developed and managed common field-level "Mutual Aid" frequencies in support of the participants in California's Master Mutual Aid, Law Enforcement Mutual Aid, and Fire & Rescue Mutual Aid systems. The operations on these frequencies are governed by plans and procedures that were developed by committees consisting of a mix of local, state, and federal public safety administrative, operations, and technical personnel.

Over the last 20 years, three separate Federal Advisory Committees comprised of public safety communications personnel at all levels (local, state, and federal) have recommended that common operating frequencies for public safety interoperability use be established to provide incident-based command and tactical communications among first responders.

During 2000, the FCC's *Public Safety National Coordinating Committee (NCC)*<sup>3</sup> developed initial recommendations for public safety communications interoperability, including the establishment of a *State Interoperability Executive Committee (SIEC)* based in part on California's Mutual Aid Channel governance structure. In early 2001, the FCC issued a Report and Order<sup>4</sup> that the States provide for an SIEC-like governance structure for the interoperability spectrum designated within the new 700 MHz band, and that the States approve any applications for fixed station facilities operating on those frequencies. At that time, CA OES, as the state's in-

---

<sup>3</sup> Information on the NCC, including committee reports and recommendations, may be found at <http://wireless.fcc.gov/publicsafety/ncc/>

<sup>4</sup> "Fourth Report And Order And Fifth Notice Of Proposed Rule Making in the matter of The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communication Requirements Through the Year 2010" (FCC Docket 01-10) <http://wireless.fcc.gov/releases/fcc0110.pdf>

place coordinator of mutual aid communications activities, was designated to provide these functions.

In 2003, following the issuance of the NCC's final recommendations, OES adopted the recommendation that the states administer all of the FCC-designated interoperability spectrum through a common *Statewide Interoperability Executive Committee*, and established CALSIEC to manage *all* of the interoperability spectrum within California, on behalf of all (local, tribal, state, and federal) first responders. CALSIEC is meeting and developing a management plan to move forward on the development of revised governance documents, including operational and technical standards and practices, in concert with California's implementation of the *National Incident Management System*. Initial progress and activity of the CALSIEC organization was a highlight in the PSRSPC's 2004 Report to the Legislature, focusing upon local feedback received in the three regional workshops held in 2003.

### ***Prior Reports and Documents***

There have been several examinations of the modernization and interoperability landscape in California in recent years. As the PSRSPC and its partners move forward to craft a new communications Plan for the state, it is worthwhile to examine elements of these past efforts that are applicable today. (Appendix E has a detailed review of the 1997 and 1999 reports for historical context.)

#### ***Partnering for the Future: A Strategic Plan for California's Public Safety Radio Communications***, January 1997 (PRISM Report Executive Summary)

Since 1997, focusing events like the California electricity crisis in 2000 and 2001, the 2003 firestorm in San Diego, the 2004 Indian Ocean earthquake/tsunami—and 2005's Hurricanes Katrina, Rita, and Wilma—have made the case for communication change as compelling as ever. The PSRSPC has identified many overarching themes in the 1997 Public Safety Radio Integrated System Management (PRISM) Report that remain relevant to the challenge of achieving interoperability in state agency public safety communications. In particular, the systematic obstacles to interoperability that were identified in the 1997 report still persist today. State agencies continue to use the radio frequencies ranging across the spectrum allotted for public safety use, even though radio users operating in one frequency band cannot talk to users operating on a different band. As a result, communication among state agencies, and sometimes among different divisions within the same agency, remains severely restricted. State agencies continue to suffer from channel congestion and limited functionality. Competition for limited spectrum resources remains a concern. Changing regulations, new technologies, and rising costs continue to be challenges.

#### ***April 1999 Cost Benefit Analysis for California's Public Safety Radio Project***

*The Cost Benefit Analysis* remains a relevant document to interoperability planning in 2005. Recognizing inefficiencies in the status quo of having separate systems for each department, it recommended the development of a shared radio system infrastructure by State public safety agencies as the best alternative to address department communications needs and improving interoperability, both for day-to-day operations and emergency response situations. The PSRSPC feels there is merit today of the report's conclusion that a shared infrastructure approach is the most cost-effective means of obtaining enhanced system functionality and the most effective way of pursuing new spectrum allocations. This conclusion as well as with other options outlined in



the report warrant further consideration today. The Cost Benefit Analysis identified the benefits on shared radio communications infrastructure as:

- Increased ability of public safety agencies to accomplish their missions;
- Improved ability to directly interoperate with mutual aid cooperators;
- Faster, more accurate access to information;
- Ability to support continued system growth through the deployment of mobile data; and
- Ability to reduce channel congestion & improve cost effectiveness

Although the cost estimates would have to be updated to 2005 figures, the PSRSPC believes that the conclusions of the Cost Benefit Analysis remain relevant.

*Report to the Legislature: Activities of the Public Safety Radio Strategic Planning Committee, March 2004*

In March 2004, the PSRSPC issued a status report to the legislature as required by the Public Safety Communications Act of 2002 [AB 2018 (Nakano); Chapter 1091, Statutes of 2002]. It gave a background of the PSRSPC process and described the geographical and political diversity of public safety agency communication across the state. The 2004 status report offered three recommendations for immediate action:

- Requirement for an annual report from the PSRSPC
- Provide support funding for the efforts of the PSRSPC
- Sustaining current system infrastructure, equipment, and mountaintop repeater sites.

The report emphasized the need for legislative and executive support in light of these recommendations, recommendations that remain relevant today.

Many of the needs and items identified the PSRSPC Work Plan for 2004 continue to be addressed by the PSRSPC. California's population has grown without corresponding increases in investment for public safety communications systems or infrastructure. The consequences of not coordinating with local entities is emphasized through recent disasters such as Hurricane Katrina.

## Appendix G

### Sample Scenario (Multi-Discipline/Multi- Jurisdictional)

From the Department of Homeland Security's SAFECOM Program *Statement of Requirements for Public Safety Wireless Communications & Interoperability Version 1.0, March 10, 2004*

#### 3.5 Multi-Discipline/Multi-Jurisdiction-Explosion Scenario

This scenario focuses on the command and control, asset status and tracking, and major communications interoperability aspects of an incident involving first responders. The scenario occurs from the perspective of the Incident Commander and Emergency Commander, and does not include first person, first responder perspectives. The communications capabilities described in the three first responder scenarios are implied (but not described) in this scenario.

##### 3.5.1 Explosion

1. A large explosion occurs at a chemical plant in Barberville, a suburb of Brookside. There is the potential for hazardous chemical leaks as well as toxic smoke from the chemicals burning.
2. Incident Command (IC) arrives on-scene and assesses the situation. After briefly surveying the area, the IC team initiates their mobile command center and begins to receive information from the temporary network created by the on-site first responder vehicles and personnel.
3. The Emergency Manager (EM) is alerted that a major incident has occurred and brings up the command terminal in the Emergency Operations Center (EOC) to monitor the regional situation. All of the region's assets are available for query by the EM.
4. The mobile command center's display registers all of the assets that are currently on-scene, including EMS, Law Enforcement (LE), and Fire. The status of each asset is also available, but is displayed on demand.
5. IC shifts the display to a GIS overlay of the explosion, with the location of all assets shown. Areas are marked to display casualties, fires, evidence, the incident perimeter, etc. The information for the GIS displays comes from a site survey already underway by LE, Fire, and EMS personnel.
6. Information is available on the EM's system as the information is gathered by IC. This information is shown both in a GIS-map format as well as a textual set of data. On demand, the EM can call up the information on the incident as if the EM were on site in the capacity of IC.

7. As new units arrive on-scene, they are authenticated into the incident and added to the list of assets available to IC.
8. The on-scene Fire Branch monitors the status, location, and current duties of the Fire assets on their command screen, and reassigns them as necessary. Any data that is pertinent to the other Branches and IC is automatically forwarded onto their command systems. This same situation is repeated for both the LE Branch as well as the EMS Branch.
9. After completing all of the pre-defined tasks for this particular type of incident, IC begins coordinating with the LE, EMS, and Fire command posts. As IC begins directing the assets in the field, the Fire Branch informs IC that the incident is too large to be handled by the assets on hand. IC then puts in a request to the EM for the acquisition of more fire units.
10. As the request for more fire assets comes into the EM, the EM initiates the Mutual Aid agreements in place, and units are dispatched from the Brookside Metro area to Barberville.
11. The EMS Branch sets up a triage/treatment area and begins to direct the resources available to identify and handle casualties. The location of the triage/treatment area is disseminated to all first responders on-scene, and the area medical facilities are alerted as to the status of the triage/treatment area.
12. The Fire Branch is notified of an emergency on their command screen as one of the firefighters in the field has a passive sensor triggered by the detection of a hazardous chemical. The sensor determines that the hazardous chemical would not be ignited by a radio transmission, allowing the network to notify all first responders within 100 feet of the particular firefighter along with LE, EMS, and IC. The Fire Branch designates this area as a Hot Zone that alerts any personnel entering the designated area as to its status.
13. Because of the potential for the release of hazardous chemicals, the EM directs all available Hazardous Materials (HazMat) teams to the location, and puts these assets under the control of IC.
14. IC sets up a secondary perimeter five blocks back from the incident.
15. The EM notes the perimeter change and initiates a Reverse 9-1-1 warning call that is sent to all fixed and cellular telephones inside the secondary perimeter. This call instructs the people inside the perimeter to find shelter in the area quickly and to close off all outside ventilation.
16. The LE Branch is directed by IC to coordinate with the Department of Transportation (DOT) to configure traffic management assets, such as traffic lights and electronic signs, to divert traffic away from the incident.

17. The LE Branch has enough assets to establish a perimeter, but needs more assets to maintain the security of the incident. IC puts in a request for LE assets to the EM.
18. The EM begins to coordinate with the public utilities and other pertinent private organizations for the appropriate responses, such as shutting down gas lines to the area, and dispatching electrical crews to handle situations, such as downed power lines. The EM also directs additional LE assets into the area upon receiving the request from IC.
19. Upon further investigation by LE and Fire assets, IC determines that this explosion was not an accident, directs LE to treat the area as a crime scene, and assigns Detectives to begin an investigation of the crime scene in coordination with Fire Investigators. This information is also available to the EM.
20. After determining that the probable cause of the situation is a bomb, IC directs the LE Branch to begin directing traffic away from the scene and to initiate a secondary explosive device search by the Explosive Ordnance Disposal (EOD) team.
21. The EMS Branch continues to coordinate the efforts of EMS assets. As casualty information comes onto the command screen via the RF ID tags used by personnel in the field, the most critical cases are selected for transport to the nearest available hospitals. The EMS Branch believes that the on-scene casualties will overburden the medical facilities selected to handle them. The transportation officer is directed to query the local medical facilities as to their status, and their capacity for casualties and what types of casualties can be taken. Casualty statistics are available on demand by IC and the EM. Additionally, the local medical centers coordinate among themselves regarding resource availability.
22. The EM begins to monitor the status of the casualties, as well as the status of the responding medical facilities. Seeing the casualties from the incident will overburden the nearby facilities, the EM puts a neighboring medical facility on alert for incoming casualties. The EM also directs additional EMS crews to respond to the incident.
23. As EMS assets arrive on-scene, the assets are registered and their capabilities are authorized for placement into the EMS asset pool for assignments given by the EMS Branch.
24. The Unit Commander of the EOD team notifies the LE Branch that no secondary devices have been found. The LE Branch pushes this information to IC. IC then automatically forwards this information to the EM.
25. The Fire Branch alerts IC that all of the fires have been identified and are marginally contained. Additionally, the hazardous chemical spill has been contained and eliminated by the HazMat teams dispatched by the EM. All but one HazMat team is released back into the asset pool.

26. The Fire Branch alerts IC that all of the fires have been eliminated, and that all but one Fire Crew has been released back into the asset pool.
27. The EMS Branch alerts IC that all of the casualties have been evacuated to appropriate medical facilities. The coroner has been contacted to begin removal of the corpses

### **3.5.2 Multi-Discipline/Multi-Jurisdiction Communications Summary**

The abstracted view of the Incident is very different from that of a first responder reacting to a situation in the field. As such, their communication needs and capabilities are tailored to meet those differences. While the communications and actions depicted in the scenario are oversimplified versions of what could actually have occurred in real life, what has been captured is the general nature of communications, the command and control functionality, and examples of access to a wide variety of information on an on-demand basis. The command and control of Incident Command on-scene and the Emergency Manager provides for the safety and accountability of all assets at the incident and provides information on additional resources that could be brought to the incident. The networks for communication and information exchange are critically important.

## Appendix H

### Map of California Mutual Aid Regions with Urban Area Security Initiative Cities Identified.

